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Small firms, global economies: The economic sociology of the northwest Atlantic sea urchin industry

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SMALL FIRMS, GLOBAL ECONOMIES: THE ECONOMIC SOCIOLOGY OF THE NORTHWEST ATLANTIC SEA URCHIN INDUSTRY

BY

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DISSERTATION

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For Carrie

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IN THE SUMMER OF 1996, A COLLEAGUE INTRODUCED ME TO A SEA URCHIN DIVER WORKing along the coast of Maine. This was the first of countless instances in which people took the time from their lives to help me complete this project. These included people working in the sea urchin industry, in governmental agencies concerned with the industry and many kind residents of the coastal communities where I conducted my work. In order to assure their privacy, I can not thank these people by name. Throughout this work names have been changed to maintain confidentiality. I could not have completed this project without their help, and I am deeply indebted to each person who assisted me in my research.

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Abstract

Small Firms, Global Economies:

The Economic Sociology of the Northwest Atlantic Sea Urchin Industry

by

Sean R. Lauer

University of New Hampshire, May, 1999

LIKE A FIELD ON FIRE. SO WENT THE SEA URCHIN INDUSTRY ACCORDING TO ONE participant. Over the course of the industry's history, more than one observer has described its development in a similar fashion: a gold rush, a boom.

> When the draggers, and then the divers that started getting into it, it was like a field fire. You light a match, and then the smaller it starts... Everybody who had any kind of fondness to the water, some that didn't even, wasn't fond of the water, couldn't even swim. It was, like I say, like a field on fire around here for a while.

In 1985 the green sea urchin was little more than a nuisance to local fishermen. They clogged the traps of lobstermen creating extra work. Perhaps more important, sea urchins threatened the coastal ecology by damaging kelp beds that provide food and shelter for other fish essential to local economies. This changed when the "trash" fish became a commodity with dramatically rising value in international markets. The vast majority of East Coast sea urchins supply a Japanese market where the roe is a delicacy popular during holidays.

This dissertation examines the organizational dynamics of firms operating in the East Coast sea urchin industry. First, I examine the confluence of economic and political

conditions under which the industry evolved. As a part of the export driven growth of the past decade in the US the East Coast sea urchin industry benefited from political conditions, which encouraged development of global markets for US products. Along with this, the Japanese have displayed a seemingly insatiable demand for sea urchin roe through the 1990s. In 1971 the governance of the international monetary system changed from a fixed to floating exchange rate. The yen's value began to increase compared to other currencies making export of products to Japan financially viable. These economic and political conditions set the stage for the East Coast sea urchin industry.

To explain how the industry developed I draw on theory and research from Institutional Economics and Economic Sociology to address entrepreneurial processes, labor market processes, and exchange processes. A supply of sea urchins existed on the East Coast as the Japanese demand grew, but the link between supply and demand remained unfilled. Entrepreneurs in the industry established firms to link supply and demand. With a link between supply and demand established, firms were faced with mobilizing a labor force for the new industry. Labor market processes include the recruitment of workers by entrepreneurs and the development of skills and technologies for completing essential activities within the productive system. With the recruitment of labor it becomes necessary to coordinate the essential activities of the productive system. Participants coordinate exchange within a productive system through hierarchies, networks or markets.

As the East Coast sea urchin industry was established and evolved these three processes (entrepreneurial, labor market, and exchange) combined to facilitate

establishment and growth of the new industry. The entrepreneurs that moved into the new industry attempted to increase the size of their firms and the amount of production. Existing production arrangements on the working waterfront provided access to the natural resource, flexible technologies, an existing knowledge base, and unique social arrangements that allowed the easy movement of a labor force into the new industry. Finally, a market form of organizing exchange developed with an institutionalized distrust between participants.

The case of the East Coast sea urchin industry provides an opportunity to examine the sociology of economic life. Its position within a global economy, and its economic boom characteristics provide a valuable empirical case study in the growing field of economic sociology.

INTRODUCTION

A REVOLUTION IN INSHORE COASTAL FISHERIES HAS OCCURRED OVER THE LAST TWO decades. A growing number of small-scale fishermen in coastal communities around the country are harvesting unusual species such as elvers, sea cucumbers, slime eels and sea urchins for markets on the other side of the globe. Small-scale inshore fisheries are not new to these coasts. However, the process and product of these new fisheries signal a fundamental break with previous practices. The most obvious difference lies in the products these fisheries provide—species of marine life that were previously little valued by local harvesters working in predominantly Western and often local markets. The fish and shellfish themselves do not appear appetizing to the Western palate, and the Westerners working in these fisheries rarely have eaten the product themselves.

Perhaps more striking to the social observer are the market characteristics of these fisheries. They serve predominantly Asian customers who do not consider these species unusual. Looking more closely at sea urchins, the Japanese have long considered sea urchin roe a delicacy serving it over rice for holidays and other special occasions (Wilen and Wessells, 1997). Until the 1970s, the Japanese ate sea urchin roe harvested from local waters; a fixed international exchange rate made sea urchin fisheries outside of Japan uneconomical. In 1971, the governance of the international monetary system changed from a fixed to floating exchange rate (McMichael, 1996, 1994), and the value of the yen began to increase compared to other currencies. This made foreign goods

cheaper for Japanese consumers and non-Japanese sea urchin fisheries supplying Japanese consumers became economically viable (Muraoka, 1990). The result was increased world sea urchin landings following the growing value of the yen (**Figure I.1**).

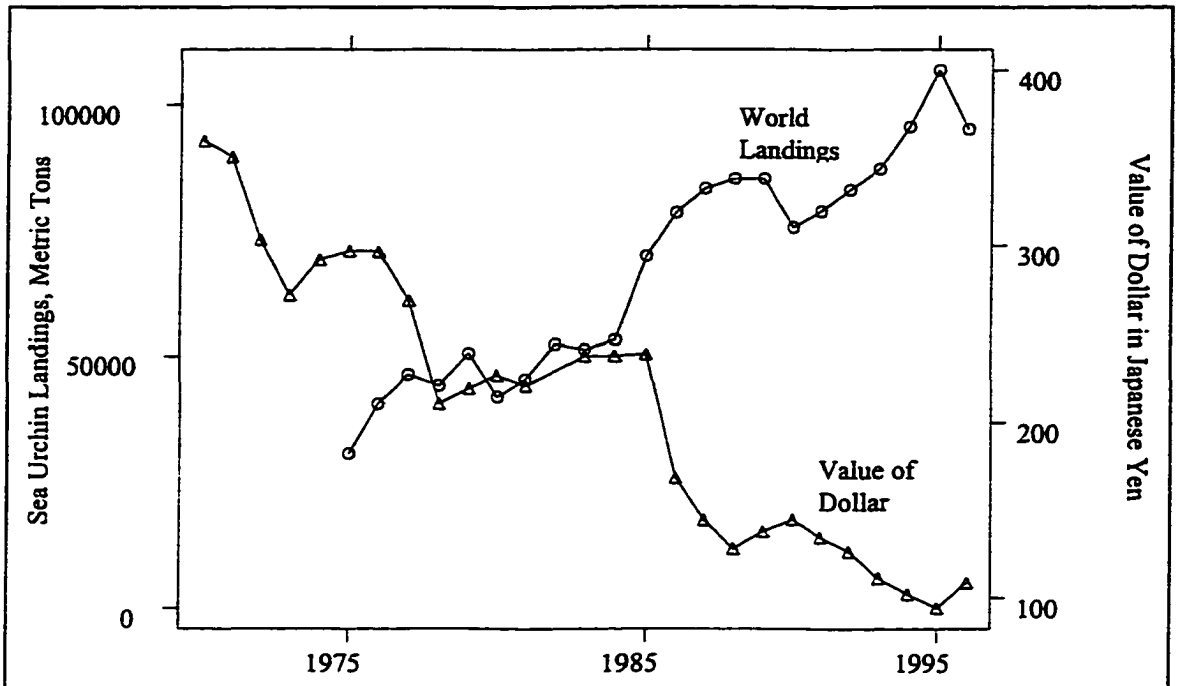

Figure I.1 Changes in World Sea Urchin Landings (MT) Compared with the Changing Value of the Dollar versus the Yen.

The analysis to follow examines the development and organizational dynamics of one of these "New Fisheries," the Northwest Atlantic sea urchin industry. The dynamics of supply and demand discussed above are essential to this industry's development. However, the analysis here focuses on the productive processes between supply and demand that contributed to the industry's development — how supply and demand become linked to form an industry. I approach this problem with a concern for the evolutionary path of organizational development.

- Do the revolutionary changes taking place in inshore fisheries include new organizational arrangements or strategies for survival?
- How do these new industries develop? Who takes advantage of the opportunities that develop?

- Do firms within this new fishery develop long-term reciprocal relationships similar to other small-scale inshore fisheries?
- Do market based or bureaucratic organizational strategies arise under the new institutional circumstances?

These questions address the central problems addressed by this research: the problem of organizing production. More than practical necessity, there is a variety of ways to organize production, and the process of organizing production can have varying consequences for the evolution of the industry. In particular, the analysis to come considers the organizational dynamics of small-firms.

Small-Firms in Global Economies

One paradox of the late twentieth century is the persistence and growth of small firms (Granovetter, 1984; Sabel and Zeitlin, 1985). The paradox lies in the growth of these small-firms, often firmly rooted in particular regions, as the range of markets and production has begun to span the globe (Saxenian, 1994). Social observers have turned their attention to small firms in global economies.

Of particular interest to economic sociology, these small-firms have developed unique organizational dynamics that have lead to an exciting area of research on economic institutions (Lazerson, 1988). This research agenda has begun to document the variety of exchange relationships between small firms that exist in the productive process. Institutional economists with an interest in the development of large bureaucratic firms originally found this research within their purview. Large firms maintain control of a wide range of productive activities through vertical integration. Rather than use market transactions to obtain goods, goods flow through long-term, hierarchical exchange relations. In an effort to understand the decision to use markets or

hierarchies in production, institutional economists began to examine productive arrangements to uncover the use of markets and hierarchies.[1] In a surprising turn, researchers uncovered a set of productive exchange arrangements that were neither markets nor hierarchies.[2]

Economists initially termed these arrangements a hybrid between market and hierarchy. However, economic sociologists began to take interest and identified the new set of exchange arrangements networks of production or small-firm networks. In the network form of productive arrangements resources and transactions flow through small-firms linked by reciprocal mutually supportive actions. The relations are non-hierarchical, but they are not the anonymous one-time exchanges associated with markets. Powell (1990a) finds the relationships in networks provide advantages in productive environments with uncertain resource supplies or demand. These environments require regular innovation and adaptation. Information is essential to this process, and the strong reciprocal ties provide flows of reliable information.

These networks of production encompass a variety of organizational arrangements. In some cases, they are tight-knit relations between independent businesses, what Eccles (1981) calls a quasi-firm. Customers and suppliers who work together regularly develop strong long-term ties of mutual satisfaction (Eccles, 1981; Wilson, 1980). A number of researchers have found network relations to concentrate in certain regions; Silicon Valley in California, the Emilia-Romagna Region of Northern Italy, and Southwestern Germany (Saxenian, 1994; Brusco, 1982; Herrigel, 1990). In these industrial districts, networks of small-firms collaborate to produce a variety of

[1] The theoretic work of Oliver Williamson (1975, 1985) is most important in this research agenda.
[2] See Powell (1990) for a discussion of this development. The insights found there inform this review.

products. Small firms collaborate on a project by project basis based on the skills and technology of the collaborators. Consequently, the diversity of skills and technology along with the dense reciprocal ties of the firms allow the district to adapt easily to market changes. The Japanese and Korean business groups cross both industry and regional boundaries. These networks of independent firms cooperate exclusively, develop a shared group identity, and have an authoritative structure (Granovetter, 1994; Yoshino and Lifson, 1986).

The growing evidence for the proliferation and variety of networks of production has provided an exciting empirical and theoretical environment for economic sociology as researchers attempt to uncover the products and processes of these forms. The theoretical questions raised by cooperative relations in economic life - an area typically considered the realm of self-seeking actions – are particularly interesting.

- Do social forces influence the initiation and development of these unique organizational forms?
- Do the cooperation and trust found in these relations result from rational pursuit of self-interest? Do they rely on the influence of existing social relations in economic life?
- Much is made of the advantages of networks. Do limits to the adaptability of these organizational forms exist? Do social forces constrain the adaptability of production networks?

Chapter 1 develops the theoretical aspects of these questions. Below I look more closely at the Northwest Atlantic sea urchin industry considering why it serves as a unique opportunity to examine these questions.

The Northwest Atlantic Sea Urchin Industry

Following the emergence and development of the Northwest Atlantic sea urchin industry provides insight into the organizational dynamics of small firms in global economies. First, the history of the Northwest Atlantic sea urchin fishery takes place within the context of a larger international market for sea urchin Uni in Japan. *Stongylocentrotus droebachiensis* (the green sea urchin from now on) is a member of the Enchinoderm phylum along with starfish, sand dollars, and sea cucumbers. There are over 800 species of urchins around the world including the red and purple urchins found along the West Coast of North America. The green sea urchin is about the size of a tennis ball slightly flattened at the poles. It is a shellfish with short green spines extending through its shell, and found in shallow inter-tidal pools or in ocean depths as great as 80 to 90 feet. They are most common in the shallow subtidal zone under 30' on rocky, gravely or shelly ocean floors.

The sea urchin's reproductive organs, their roe, are a delicacy in Japan called Uni. If you were to crack open a sea urchin from its bottom center, you would notice the urchin's reproductive organs. The roe is orange, triangular and resembles a tangerine wedge. There are five pieces of roe, which make up 10 to 25 percent of the urchin weight. They are arranged like a star inside the urchin. The roe is essentially a storage organ for nutrients not immediately needed for regular body metabolism. When the urchin eats well, the gonad development reaches its ideal orange-yellow color and increases in size. When food levels are low or not ideal, the sea urchin uses nutrients from the gonads for regular metabolism and the roe takes on a gray color.

Uni has traditionally come from the waters surrounding Japan where two types of urchins are found resembling the green and red sea urchins. The Japanese consumer prefers the Japanese urchin above all others, and prefers other varieties of urchin that approach this urchin in size, color, and texture. Prices for the sea urchin are set in the Tsukiji Auction, the large Tokyo seafood auction, and vary according to demand, and competition from other sources. The demand for Uni is highest during the holidays from mid December through early January, although spurts of demand occur during other holidays such as the Japanese equivalent of thanksgiving in mid-August.

A Global Industry

The sea urchin industry was traditionally domestic to Japan. However, within the last three decades the industry has become an international productive system. This change from domestic to international productive system developed from changes of international monetary agreements. In 1944, the Bretton-Woods agreement set a fixed exchange rate for currency exchange. In 1971, President Nixon instituted a floating exchange rate to replace the fixed exchange rates. For the Yen to Dollar exchange, these changes resulted in a decline in value of the Dollar vs. the Yen resulting in favorable export conditions from the US to Japan. For instance, in 1970, 360 Yen could buy one Dollar worth of US goods. In 1993, 360 Yen could buy over three Dollars worth of US goods. The dropping value of the Dollar compared to the Yen has continued with the Japanese Yen able to purchase more US goods for the same price as the value of the Dollar dropped.[3] These changes meant increased profits for importing US sea urchin. Importing lower quality sea urchin sold for a lower price became profitable, also.

[3] **See Figure I.1 p. 2.**

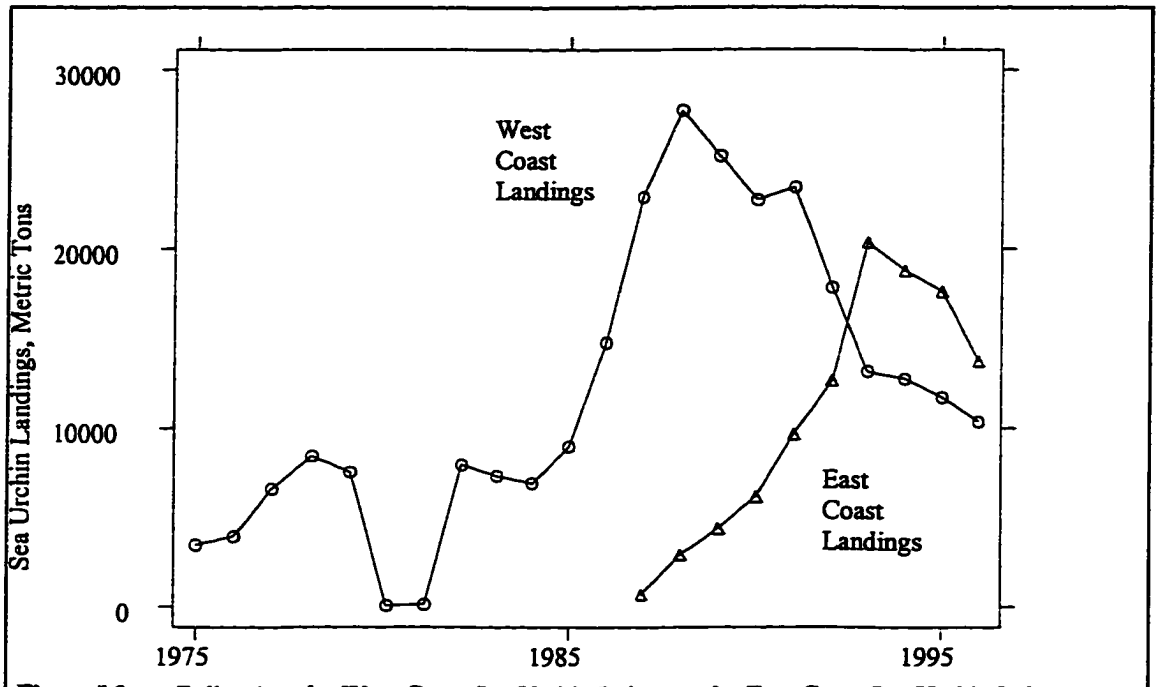

Figure I.2 Following the West Coast Sea Urchin Industry, the East Coast Sea Urchin Industry Peaked in 1993.

Seafood has always been an important part of the Japanese diet, and with the strengthening of the Yen there began a steady increase of seafood imports to Japan (see **Figure I.2**). In many cases, the unique tastes of the Japanese led to harvesting of species underutilized outside of Japan. In the US, federal initiatives to increase exports to Japan accompanied these favorable economic conditions.[4] In the mid to late 1970s the United States negotiated a number of multilateral and bilateral trade agreements, known as "Fish and Chips" policy, to reduce US seafood import barriers to foreign countries. In Japan, these agreements included reduced tariffs on underutilized species such as squid and eels. The combined economic and political conditions resulted in increased US exports to Japan beginning in the 1970s. The sea urchin industry fits within these global economic and political changes. Non-Japanese landings of sea urchins were first recorded in 1975,

[4] Hayes, Robert. 1982. Speech given at University of Maine Marine Law Institute Conference on East Coast Fisheries Law.

in 1983 non-Japanese landings surpassed Japanese landings, and today non-Japanese landings more than double landings domestic to Japan (see **Figure I.4**). The dramatic increase of world landings and the slight decline in Japanese landings are both a result of the increased demand for Uni among Japanese.

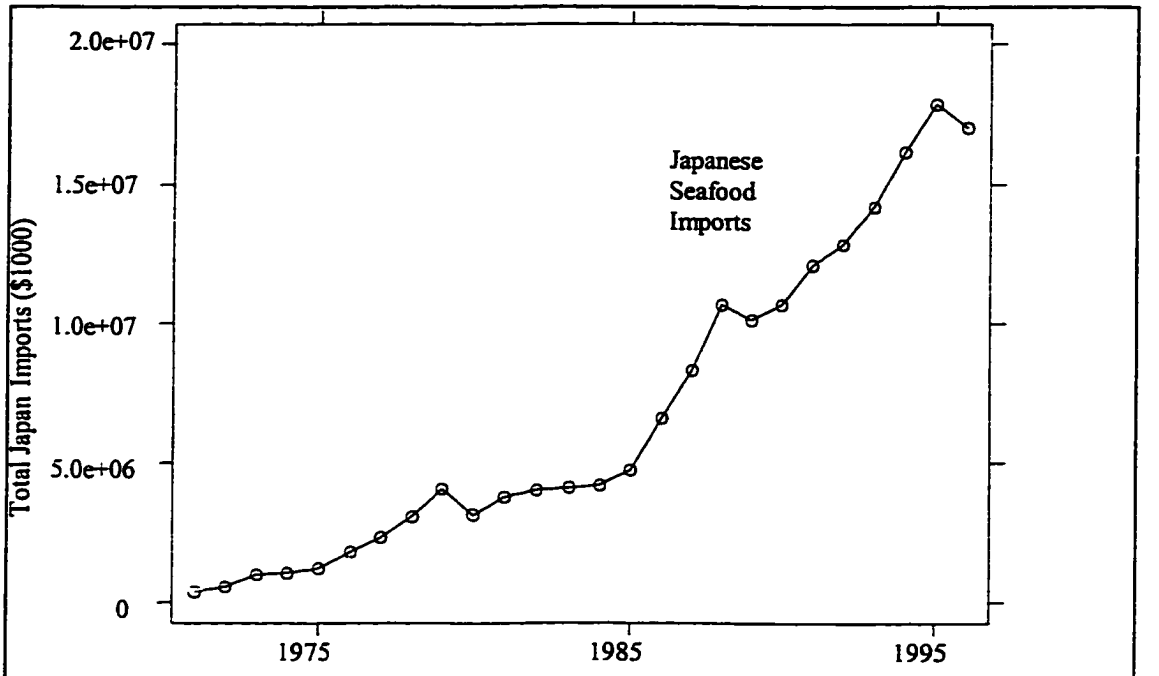

Figure I.3 Japanese Imports of Seafood have Increased Steadily Since 1971.

The first sea urchin fishery in the North America developed in the mid 1970s on the US West Coast where fishermen began harvesting, and processors began exporting, the large red sea urchin. West Coast landings peaked in 1988 and have dropped off as landings increased in other regions (see **Figure I.3**). On the East Coast of North America, sea urchin populations are concentrated in the Gulf of Maine because their reproductive processes require cold waters. This has concentrated the industry on the North Eastern Coast, particularly the US state of Maine. Urchin populations in the Gulf of Maine began to grow in the early 1980s. A group of University biologists watched as one of their study areas changed from a diverse ecological community to an "urchin

barren," or a homogenous carpet of green sea urchins. Similar processes were taking place around the Gulf of Maine as sea urchin populations increased in their density and geographic expansion. This increase in urchin populations provided the raw product necessary for the industry that soon developed.

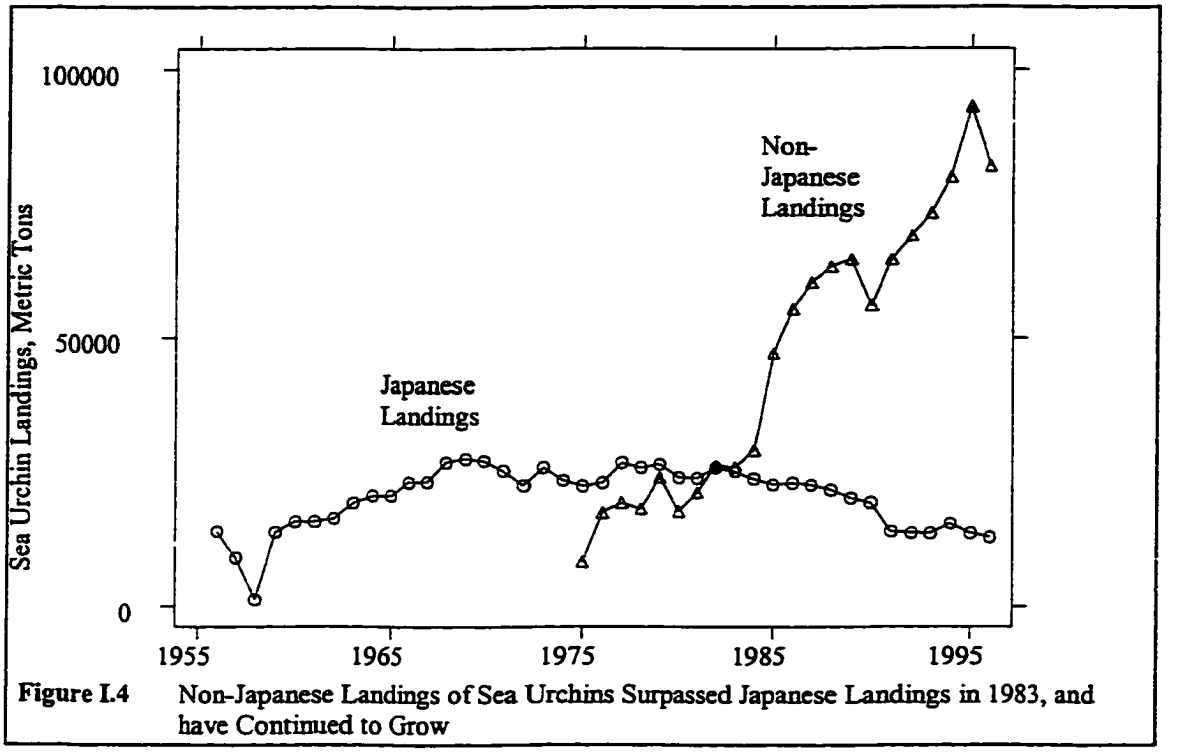

Figure I.4 Non-Japanese Landings of Sea Urchins Surpassed Japanese Landings in 1983, and have Continued to Grow

The Northwest Atlantic sea urchin industry really got started in the years from 1985 to 1988 when a set of firms in Maine began buying and exporting sea urchins for the Japanese consumer. Before this, some fishermen harvested sea urchins, and a few dealers along the coast bought sea urchins for a small domestic market. There had long been a domestic demand for sea urchin roe in sushi restaurants and among some European immigrant populations. These urchins were sold in large cities such as New York and Chicago where ethnic restaurants and consumers desired the sea urchin roe. However, in the mid-1980s three companies in particular, The Urchin Merchant, ISF

Trading, and Seafood Atlantic, began buying, processing and exporting sea urchins from Maine. For the next 7 years, these three exporters handled a majority of the sea urchins bought and exported from Maine. The industry developed quickly, and in 1993 sea urchin was Maine's second largest fishery behind lobsters, selling nearly 20 thousand metric tons worth $30 million (see **Figure I.3**). During these boom years competition among buyers increased. The three large exporters always competed among themselves, but at this time, a number of small upstart buyers entered the industry. The new competition sent prices soaring, and at times, buyers would be at the wharves bidding against each other for a harvester's catch.

Small Firm Production

The Northwest Atlantic sea urchin industry appears to rely on the productive activities of small firms located along the East Coast of the US. To produce sea urchin Uni for the Japanese consumer involves harvesting sea urchins, landing and transporting the catch to a processor, separating the eggs from the urchin, and bringing the Uni to the Japanese market. A large number of formally independent small-firms carry out these separate activities.

Harvesting Sea Urchins

There are currently 1,385 independently licensed harvesters using two different methods of harvesting, scuba diving, and dragging. Harvesters actually take the urchin from the ocean using the different forms of technology. **Table I.1** contains some basic quantitative information on sea urchin harvesters.

Diving. SCUBA diving is the dominant form of sea urchin harvesting around the world. Divers spend from 4 to 6 hours a day in winter waters filling totes with urchins collected from the ocean floor with a small hand held tool. The divers choose a site to harvest, and search the bottom filling the totes with their catch. They dump their totes in large trays holding approximately 60 to 100 pounds of live sea urchins. At times, a diver could harvest over 30 trays a day. Because they can closely monitor their catch, the divers are able to collect a high quality urchin.

When the fishery first began many divers went out alone on a small skiff to dive for urchins. Diving alone can be very dangerous; a number of accidents occurred and some lives were lost. Currently all divers are mandated by the State of Maine to bring a licensed tender on board to man the boats while divers work the ocean floor. Tending primarily involves diver safety, but includes some harvesting duties that take place out of the water such as moving urchins from totes to trays, and culling the catch for undersized and low quality urchins. Both divers and tenders are independent contractors. They work together in a few different ways. Some divers own their own boat, hire a tender, and pay him a proportion of the catch value that day (the lay system[5]). Some tenders own boats, and contract them out as a diving platform. These tenders receive a fee to take out divers and provide tending duties. Other divers combine these options. They own their own boat, hire a tender using the lay system, and contract out their boat for other divers to use as a platform. Still other divers work out unique arrangements, including diving and tending partnerships. These divers switch diving and tending duties every other day and split earnings each day.

[5] For a discussion of the lay system of pay see Doeringer et al. (1986).

Of the 1,385 current licensed harvesters 72% (997) are divers. Since 1994, when DMR started collecting licensing information, 1,135 divers have chosen not to renew their licenses. Most likely, this means they have stopped diving, but perhaps some of these divers continue to harvest illegally. All current divers are residents of Maine, and they live in any number of communities along the coast.

Table I.1 1996-97 Season Licensing Data for Sea Urchin Dealers, Processors, Exporters, and Harvesters[6].
▪ 80 sea urchin dealers
▪ 19 sea urchin processors.
▪ 10 sea urchin transporters.
▪ 23 1994-95 firms remaining in industry.
▪ 997 Sea urchin divers.
▪ 388 sea urchin draggers.

[6] Data compiled from licensing information collected by DMR.

Stew is a diver who grew up on the coast of Maine in a suburb just east of Portland. He started in fisheries digging clams and later learned to scuba dive for scallops. He began diving for urchins in the mid 1980s and worked along the south shore. For the last four years, he has been working out of a small port town in downeast Maine. During the season he pays for a room by the night and takes occasional trips back down to Portland. He does not mind migrating, and has made some friends in the town. Also, many say the urchins are better downeast. Stew dives alone from his small boat, or skiff. He has constructed a shelter for it to keep warm in the winter. He has always had trouble finding a tender and recently convinced his younger brother Riley to migrate with him. They work together when they can. If Riley cannot tend, Stew has found one local man that can often fill in.

Dragging. The East Coast is the only sea urchin fishery that uses the dragging technology to harvest sea urchins. A dragger's boat includes a large tow that scrapes the ocean floor and catches the urchins disrupted by the scrape. Fishermen use this technology in the groundfish or scallop fisheries and switch to the urchin fishery during its season. In the early years, before the Japanese demand, dealers in the domestic markets encouraged local draggers to try harvesting sea urchins. Diving was not a common fishing technology, and the draggers were successful. They knew where the urchins were from emptying their drags while fishing for scallops. Draggers can not collect as high quality urchin as the divers because of the less selective method. Dragging also can damage the urchins, cracking shells and breaking spines, which decreases the value of the catch. Many draggers use a "Green drag," which is lighter than

a scallop drag. The lighter drag is good for urchin fishing because it does less damage to the urchin. John Green, a dragger fishing for sea urchins in the early days of the fishery, invented the "Green drag." He knew he could increase the value of his catch by decreasing the damage done while dragging, so he designed a drag to protect the urchin. When the industry grew John Green marketed his "Green Drag" to other draggers getting into the new fishery.

A dragger's boat and gear require a more substantial capital investment than a diver's does. They must pay a larger crew to operate the larger boat, and some own more than one boat with a hired crew and captain. Typically, draggers in the sea urchin fishery used their boat and gear in another fishery before trying sea urchins. They got into the sea urchin fishery for supplemental income during the closed period of the scallop or shrimp fisheries. Of the 1,385 currently licensed harvesters 388 (28%) are draggers.

Crusty owns two boats that drag for sea urchins in Downeast Maine. He fishes from a port 20 minutes drive from his home. He and the crew spend a few nights a week living on the boat while fishing. Crusty captains one boat, and his long-time friend Tim captains the other. Each boat's crew includes two laborers that clean the drag and cull the urchins. Although Crusty handles the recruitment of labor and the payroll for the boats, he allows Tim the freedom to pursue his captain work independently. Tim chooses when and where to fish without having to consult Crusty. Crusty's boats use a "Green drag" which is lighter than his scallop drag. After the urchin season, Crusty switches back to the heavy drag for the scallop season.

Buying, Transporting, Processing and Exporting

Harvesters collect urchins from the ocean floor and bring them to a local dock or wharf. A day's harvest of sea urchins passes through several actors' hands before reaching its final destination in Japan. These include coast-side dealers, processors, and exporters. For most harvesters the coast-side dealer is the person they meet at the wharf. The coast-side dealer then transports the product from the draggers and divers at the wharf to larger dealers or processors. These are small firms, sometimes a single individual working independently, and sometimes not a formally recognized business. Most coast-side dealers do not actually buy the urchins, but transport them to a wholesale exporter or processor for a percentage of the payment made to the harvester. The coast-side dealer make anywhere from five to 20 cents on the pound, paid by a wholesaler or processor. Coast-side dealers can be formally independent firms recognized as a small business legally and recognized by the Department of Marine Resources as a sea urchin buyer. These firms often sell all their sea urchins to a regular customer, although some divide their sales among a few customers.

Other coast-side dealers are recognized legally as independent firms, but are not recognized as sea urchin buyers by the Department of Marine Resources. These firms obtain permission to buy sea urchins by working under a wholesaler or processor. These dealers may work under more than one customer's license, although they often sell exclusively to one customer. Still other coast-side dealers are not recognized independent businesses or recognized buyers. It is difficult to estimate the number of coast-side dealers in the sea urchin fishery[7]. There are at least 60 coast-side dealers

[7] DMR uses a blanket dealers license for any firm that buys or transports sea urchins in the sate. This includes many processors and wholesalers along with independent coast-side dealers. There are also

independently recognized by the DMR as sea urchin buyers. However, it is hard to say how many of these recognized buyers are active and there could be any number of non-recognized coast-side dealers operating in the many small East Coast ports.

Processors actually separate the roe from the urchin and package it for sale in the Japanese market. A processor requires a facility to process the urchins, equipment for processing, and finances to buy a large amount of the resource and hire a labor force. Many of the sea urchin processors labor force comes from the Cambodian and Vietnamese refugee community. This community was attracted to the job because it includes flexible hours and no language or western cultural expertise. Many processors believe the Southeast Asians have a special talent for the work. Processing requires a certain skilled delicacy with the product. The processors believe this group has a talent for combining this delicate handling with speed.

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some Canadian firms that solely transport sea urchins to Maine processors. Non-recognized dealers further complicate the estimation. DMR recognizes 80 dealers, 19 of which are processors. It is not unreasonable to assume that each area includes at least one or two buyers, which might lead to estimates of over 100 coast-side dealers.

Mati Ohsono originally worked for a Japanese trading company. At one time he had nothing to do with sea urchins; he bought and sold large machinery. However, in 1989 his company was looking for someone to come to Maine and work in the sea urchin industry. Ohsono volunteered to move his family to this country. When he first came to the US he was buying whole sea urchins from middlemen and would then ship them to Japan where his trading company would take over the distribution of the product. He did this until 1992 when he won a lottery for a green card, and realized he could start his own business here in the US. His former employer encouraged him to do this.

Today Oshono runs his own processing plant in Portland. He hired a staff of Cambodian and Vietnamese processors who work piece rate. He receives his supply from three separate coast-side dealers, one each in the south-shore, mid-coast, and downeast regions. Oshono no longer sells exclusively to his trading company. Instead, he sells 70% of his product at a fixed price to a retail distributor, and 30% he sends to the Tsukiji Auction in Tokyo through a broker.

Table I.1 shows that during the 1996-97 sea urchin season 47 firms held a license to buy or transport sea urchins in the state of Maine[8]. Ten of these dealers were also processors, and five other firms held only processing licenses. Though five of these firms only work in the sea urchin fishery, most hold licenses in at least one other fishery. Dealers and processors hold licenses to buy or process an average of 9 other species and 25% hold 16 or more other seafood industry licenses. There were 20 firms with license to export to Japan in 1994-95. These firms typically held a license in buying or

[8] All quantitative data on dealers, processors and exporters compiled from DMR records on license holders.

processing urchins also. Ten of these firms held licenses to export other species, while ten only export urchins. A few firms export to other Asian countries as well.

The data on the 1996-97 season is not as complete as the 1994-95 season. However, there are some interesting changes from the limited data. There are 90 firms currently licensed to buy or transport sea urchins in the state of Maine. New to the 1996-97 season, a few firms were based outside the state of Maine. Four firms buy sea urchins in Canada and buy a permit to transport their urchins to buyers and processors in the state of Maine. Six others buy sea urchins in Maine, but then transport them to processing plants in Massachusetts and New York. Of the remaining 80 firms 19 (24%) are processors located in Maine. In contrast to 1994-95, processors have begun to concentrate in Portland where 13 of the 19 current processors are located. A number of firms have dropped out of the industry in the two seasons since 1994-95. Only 23 (43%) of the firms involved in any of the three sectors (dealer, processor, exporter) of the industry in 1994-95 are currently licensed to buy sea urchins.

The Analysis to Come

The remainder of this dissertation addresses the evolutionary path of organizational development of the Northwest Atlantic sea urchin industry. It follows the emergence and development of exchange structures between firms within this changing international circumstance. The analysis addresses two primary questions: What kind of economic organization has come to fill this niche? Why did this form of economic organization develop, and not some other? Following the discussion above, the research addresses the organizational dynamics of small-firms in particular. The research will addresses several questions concerning these dynamics:

- How do social forces influence the initiation and development of these unique organizational forms?
- Do the cooperation and trust found in these relations result from rational pursuit of self-interest? Do they rely on the influence of existing social relations in economic life?
- Much is made of the advantages of networks. Do limits to the adaptability of these organizational forms exist? How might social forces constrain the adaptability of production networks?

In the chapters to come, I address these questions through an analysis of three economic processes: entrepreneurial processes, labor market processes, and exchange processes.

Entrepreneurial Processes

A supply of sea urchins existed on the East Coast as the Japanese demand grew. However, the link between supply and demand remained unfilled. Entrepreneurs in the industry established firms to link supply and demand.

Labor Processes

With a link between supply and demand established, firms were faced with mobilizing a labor force for the new industry. Labor market processes include the recruitment of workers by entrepreneurs and the development of skills and technologies for completing essential activities within the productive system.

Exchange Processes

With the recruitment of labor, it becomes necessary to coordinate the essential activities of the productive system. Participants coordinate exchange within a productive system through markets, hierarchies, or networks.

Before turning to these three processes, the following chapter returns to the questions posed above further developing them with discussions of relevant research, methodology, and the perspective of economic sociology that I apply to this case.

CHAPTER 1

THE ECONOMIC SOCIOLOGY OF THE NORTHWEST ATLANTIC SEA URCHIN INDUSTRY

SOCIOLOGISTS HAVE BEEN INTERESTED IN THE RELATIONSHIP BETWEEN ECONOMY AND society since the discipline's inception. However, the last ten years have seen a rejuvenation of economic sociology as a sub-discipline within sociology, sometimes even referred to as the "new" economic sociology[9]. One way to understand the *new* economic sociology is to consider it a reaction to the imperialistic actions of economists. Neo-classical economists such as Gary Becker began to examine traditionally sociological phenomena and apply economic explanations to them. In his well known ***Treatise on the Family*** (1981), for instance, Becker argues that decisions to marry, have children, or divorce are the result of cost-benefit economizing by individuals attempting to raise personal welfare. Taking these cost-benefit analyses towards sociological subjects such as racial discrimination and the family was typically met with praise in economics and in the general public.[10] While some sociologists adopted these economic approaches, others reacted against them by providing sociological explanations for what were traditionally considered economic phenomena. Many contemporary sociological classics have come from this interaction. For instance, there is Coleman's (1988) concept of social capital, and Granovetter's (1985) discussion of embedded economic action, among others.

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[9] See Swedberg (1997) for a recent review and evaluation of this new field.
[10] In 1992 Gary Becker was awarded the Nobel Prize in economics.

Economic sociology remains fundamentally different from the economic approach because it considers economy and economic actors an integral part of society. **Table I.1** contrasts the economic and economic sociology approaches to the economy. Economic analysis follows the assumptions of methodological individualism, and reduces all economic phenomena to the purposeful actions of autonomous individuals. The analysis begins with the individual actor unconnected to other actors or institutions. These actors hold a stable set of preferences and pursue those preferences with a formal economic rationality; they attempt to maximize utility or profit. The only limits on these actions come from the actor's tastes and the scarcity of resources (including technology).

Economic sociology starts from a dramatically different set of assumptions. We consider actors socially constructed through interpersonal interactions or through their place in society. The links to other actors and institutions form a fundamental part of this conception. Rationality is only one of many types of action. Sociologists take seriously the importance of historically constructed meanings, and actions that are not purposeful or reflective. Complexity and uncertainty can limit rationality, and existing social, political and cultural circumstances can limit desired actions.

Table 1.1 Comparison of Economics and Economic Sociology

	Economics	Economic Sociology
Concept of the Actor	Methodological Individualism. The autonomous actor is uninfluenced by other actors.	Actor is embedded within social world. The actor is influenced by other actors and is part of groups and society.
Economic Action	Assumed rationality. All economic actions are rational actions.	Variable rationality. Many different types of actions are used, including rational ones.
Constraints on the Actor	Economic actions are constrained by individual tastes and the scarcity of resources.	Economic actions are constrained by social structures, structures of meaning, and scarcity of resources.
The Relation of Economy to Society	All attention is given to the market and the economy.	The economy is an integral part of society. Society is the basic reference.
Research Methods and Goals	"Clean" models. Formal mathematical models are developed. Prediction and explanation.	"Dirty hands." Multiple methods used including historical and comparative ones. Data are collected and produced by the analyst. Description and explanation.
Intellectual Tradition	The classics are not an important part of the field.	Marx, Weber, Durkheim, Schumpter, Polanyi, Parsons/Smelser. Classics are an important part of the field.

Economics attempts to focus attention on the economy, the market and exchange while putting social variables to the side, assuming their stability. In contrast, the sociology of economic life proposes that these same economic institutions are socially created, and that economic processes are in fact social processes developing within institutional constraints. The social constraints on economic phenomena include the ecological environment (Hannen and Freeman, 1984), relations with other organizations (DiMaggio and Powell, 1983, 1991), and networks of personal relations (Granovetter, 1985). These differing social conditions both limit and create possibilities for economic action.

If the new economic sociology emerged from the polemical contrast described above, the polemics have died down to what we might consider a healthy cross-fertilization. Economists and sociologists by training watch the work of each other while walking a line between both disciplines.[11] The dynamic area of research on small-firms and networks of production typifies this kind of dialogue across disciplines. As seen in the Introduction, these new arrangements prove interesting to the research agendas of both institutional economists and economic sociologists.[12]

Industries and Organizational Dynamics

As stated previously, this analysis examines the organizational arrangements of small firms in the Northwest Atlantic sea urchin industry, and the dynamic process that lead to these arrangements. The first step is to define the unit of analysis, an industry, and the variables that affect the dynamics of an industry. *Industries* are a particular type of

[11] See Swedberg (1990) for an interesting discussion with a number of sociologists and economists who walk that line.
[12] See Powell and Smith-Doer (1994:385-391) for a review of the variety of networks of production.

economic institution (McGuire et. al., 1993). They are made up of a set of firms that 1) are a part of the same productive system, and 2) compete with firms that provide similar services or products. A *productive system* refers to the flow of goods, services, and resources among technically separable units that transform raw materials into finished products (Yoshino and Lifson, 1986; Friedland et. al., 1981; Peterson, 1978; Hirsch, 1972;Katz and Kahn, 1966). These technologically separable units are interposed between a resource and final consumers. Productive systems can vary in their division of labor. The *division of labor* varies in the extent to which the activities a part of a productive system are carried out by the same or different actors (Stinchcombe, 1983). A productive system can vary in the number of independent firms and the extent of competition between firms. It is this set of firms, those carrying out essential activities within a particular productive system and competing with firms providing similar services, that make up an industry. The *organizational field* refers to a broader set of organizations that constitute a recognized area of institutional life. An organizational field includes "key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services and products" (DiMaggio and Powell, 1983).[13]

My primary interest in this research is the formation of the Northwest Atlantic sea urchin industry and the organizational dynamics of small firms in this industry. Who initiated this new industry? How were initial relations established? How is the productive process organized? How has it changed? Answering these questions will

[13] Hannon and Carroll (1995) use the term *organizational community* to capture a similar idea. The organizational field follows closely to McGuire et al.'s (1993) conception of social structures influencing the social construction of industry also. I choose to use the organizational field concept because it includes the structural components included in Hannon and Carroll and McGuire et al, and adds a

document the organizational arrangements in the industry, and demonstrate the importance of sociological forces driving the institutional formation and change in this industry. Below I look more closely at the social forces that influence institutionalization and change in an industry by reviewing three of the primary sociological perspectives on economic organization: organizational ecology, network, and new institutional approaches. With each approach, I consider the role of organizational structure including the cooperative or trusting relations between firms, and the important social forces that influence organizational dynamics in the approach. Although clear differences exist between these approaches, they each consider economic actions and institutions embedded within larger social structures. This contrasts with the primary economic approach to analyzing economic institutions, Transaction Cost Economics.

Transaction Cost Economics

Transaction cost economics (TCE from here) stems primarily from the work of Coase (1937) and Williamson (1975,1985,1995). It is centered on the question of why firms organize productive activity one way, through markets, rather than another, through hierarchies (Coase, 1937:386). Markets and hierarchies are the primary organizational concepts within the TCE approach. Both market and hierarchical transactions are a means for goods to flow through a division of labor within a productive system. Through market transactions a large number of technically separate units carry out one-time exchanges guided by self-interest. In the pure market form, partners to the transaction are anonymous; the price mechanism attracts actors to the exchange and requires no previous or future knowledge of exchange partners. The immediacy of the exchange and its

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cognitive dynamic to the structure. The organizational field conception is more inclusive of potential

coordination by price requires no system wide governance or control. The pursuit of self-interest and the price mechanism allow for short term relations of mutual satisfaction. The market ideal requires no lasting or integrated relationships.

Hierarchies provide a sharp contrast to market forms of organization. Hierarchies integrate a division of labor through formal bureaucratic organization. Exchange flows through long-term relations governed by an authoritative power structure. Large firms create hierarchies by maintaining control of the production flow from manufacturing to distribution - called vertical integration. Blau (1993) succinctly captures production in the vertically integrated firm:

> Large firms sometimes buy their suppliers (instead of buying their suppliers' products or their raw materials) and buy their distributors and retailers (that is, buy the means of transportation and purchase outlets and franchises). Firms also hire permanent workers and buy land. Finally, coordination and administration are largely centralized even when production is carried out elsewhere (129).

One productive enterprise may purchase resources from other productive enterprises through market exchange. Distribution of the product could flow through market transactions also. However, a hierarchical, vertically integrated firm organizes these transactions under a system of authority and centralized control rather than market exchange.

The market-hierarchy distinction, and the decision to integrate, forms the base for TCE analysis and its research agenda. Theoretically the distinction is a continuum which includes hybrid forms of organization that lie between market and hierarchy known sometimes as networks (Thorelli, 1986), quasi-firms (Eccles, 1981), or clans (Ouchi, 1980). The hybrid form of organizing economic activity includes aspects of both markets

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embedded activity as a result. Also see March and Simon (1958).

and hierarchies. They involve long-term relations, but without the formal governance structures of hierarchies.

The decision of a firm to organize productive activity through markets or hierarchies lies in the amount of transaction costs associated with the exchange. The transaction, transferring goods and services across technically separable units, is the unit of analysis in the TCE approach to economic organization. Williamson (1981:552) equates transaction costs to friction in mechanical systems:

> Do the gears mesh, is there needless slippage or loss of energy? The economic counterpart to friction is transaction cost: Do the parties to an exchange operate harmoniously, are there frequent misunderstandings and conflicts that lead to delays, breakdowns and other malfunctions?

Friction, or transaction cost, is low when transactions are straightforward and non-repetitive, as in the market. However, transactions with uncertain outcomes, that recur frequently, and that include transaction specific investments (money, time, and energy) incur high transaction costs. Under these circumstances, hierarchical organization is more likely.

Trust between parties to a transaction, or the lack of trust, forms an important part of the TCE perspective. A lack of trust in transactions is included in TCE as opportunism. Under market conditions with a large number of anonymous participants, trust does not play an important role in action. Price coordinates the exchange instead. However, when the number of participants is small, transactions recur frequently, and knowledge of exchange partners is high, the possibility for opportunism arises. Similar to neo-classical economics, TCE makes the behavioral assumption that economic actors pursue their own self-interest. Acknowledging opportunism is to acknowledge the occurrence of self-interest seeking with guile. When the possibility for opportunistic

behavior increases the costs of monitoring a transaction increases. In this way, opportunism often makes it cost effective to integrate activities in a hierarchical form rather than attempt to monitor the transaction in uncertain market conditions.[14]

In the TCE framework, the focus is on individual firms and their relationships with other firms. Specifically, the focus is on transactions and the decision to integrate transactions through different organizational forms: markets or hierarchies. Uncertainty, recurrent transactions, and transaction specific investments as a result of opportunism (potential and actual) increase the costs of a transaction leading to the decision to integrate an activity rather than rely on market mechanisms in a productive system. The micro economic focus of TCE on transaction decisions contrasts with the macro focus of the first sociological approach to economic organization I examine, organization population ecology.

Organizational Ecology

Rather than examine the micro phenomena of an individual transaction, or even the adaptations and transformations of an individual firm, the Organizational Population Ecology (OPE from here) approach examines economic organization from an extreme macro position. The primary unit of analysis in the OPE approach is the set of firms, or the population of firms, that make up an industry.[15] While OPE is concerned with intra-firm characteristics such as stated goals, forms of authority, core technology, and marketing strategy, the approach examines these characteristics at the population level

[14] Bradich and Eccles (1988) provide a valuable overview of the governing mechanisms that overcome opportunism: price, authority and trust.

[15] Those following this perspective more often use the term organizational populations to describe the set of firms filling a niche, rather than an industry. In order to maintain a consistency throughout the dissertation I have decided to use the term industry to represent the organizational population. Hannon

(Hannon and Freeman, 1984, 1989). Population level thinking changes the focus of analysis to the mix of firms operating in an industry, and variables such as population density, founding rates, and mortality rates.

To better understand the dynamics of a population of firms OPE further specifies the relationship between a population and its environment. Large social structural forces, or environmental conditions, provide the resources necessary to build and sustain a population of firms forming an industry. These resources include capital, knowledge, personnel, equipment, and customers among others (Carroll and Hannon, 1995:33). OPE calls the relationship between these resources and the set of firms in an industry a fundamental niche:

> [T]he fundamental niche of an organizational form consists of the social, economic, and political conditions that can sustain the functioning of organizations that embody a particular form (Carroll and Hannon,1995:34).

Under certain resource abundance or constraints firms can arise and persist. When a set of firms share a common dependence on certain environmental conditions, the same environmental niche, OPE considers those firms a population; a set of firms making up the same industry. If the environmental conditions of a certain resource niche allow an industry to form, to grow, and to sustain its numbers, it follows that changes in environmental conditions may lead to changes in the industry. OPE proposes that the strong relationship between an industry and environmental conditions, and changes in the industry, are due to selection mechanisms.

Hawley (1968) first proposed the selective mechanisms created by environmental conditions. When the units of a population, firms in an industry for instance, face the

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and Carroll (1995) follow the same convention, specifying that an industry is one type of organizational

same environmental conditions competitive forces cause them to resemble each other. Hawley called this constraining process competitive isomorphism. Hannon and Freeman (1989) distinguish this selective process from adaptation mechanisms, which propose that changes in strategy and structure of individual firms reflect responses to environmental changes, threats, or opportunities (150). Instead, the firms that already hold the strategy and structure are selected by the environmental conditions that exist. In fact, Hannon and Freeman (1989) find it is difficult for firms to adapt to changing environmental conditions. More often as conditions change a new cohort of firms are selected by the new combination of social, economic and political conditions.

The OPE approach asks why there are so many different forms of economic organization. The focus is on population level forms, examining the mix of firms that make up industries and population level variables. The fundamental niche, created by environmental conditions, form the primary organizational concept from this approach. The environmental conditions select the set of firms that make up an industry, thus defining the organizational form. Noticeably absent from OPE is any concern with action or adaptation of firms and the relationships between firms. Without discounting their importance, the OPE approach considers embeddednes of industries within larger environmental conditions to take precedence in the analysis of population level changes. This differs from the Network approach, which considers those relationships primary to understanding economic activities.

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population an ecologist might study.

Network Organization

Perhaps it isn't surprising that the network, the set of nodes (persons, firms) linked by a set of social relationships of a specified type (Laumann et al., 1978:458), forms the primary organizational concept in the Network approach to economic organization. From this approach, the structure of economic organization in an industry is the pattern of formal and informal relations recurring within a productive system. All industries can be reduced to the set of recurring relations that make up an industry. Recurring relations can occur within a hierarchical firm, but many, perhaps most, important relations occur between firms within the same organizational field. The formal relations within a hierarchical firm or between firms in a productive system form a web of relations within an industry, but the Network analyst does not limit analysis to these relations. Rather, informal relations, including hidden networks of friendship, advice, and conversation, are an equally important structure of ties.

At the center of the Network approach, we find individuals and firms with actions and attitudes influenced by the position of an individual or firm within a network. Position within a network varies along five key variables: cohesion, equivalence, prominence, range, and brokerage (see Burt and Minor, 1983). Cohesive individuals and firms share strong common relations with one another. Equivalent nodes do not share a common tie with each other, but share a common position within the productive system. Both cohesion and equivalence are positions that predict similarities between the actions of individuals and firms. Prominence, range, and brokerage are positions that provide an advantage relative to others in the network. Rather than point out similarities, these positions highlight differences and positions of power and influence in a network.

Prominence refers to the relative demand of an individual or firm within a network. Range is simply the size of an individuals or firms network, which translates to access to resources. Brokerage positions provide a contact between disorganized individuals or firms, allowing them to pursue their own interests freely.

Existing networks of personal relations are primary in the network approach. All economic actors are embedded within existing and ongoing networks of personal relations. Trust in economic relations, and these existing social ties are closely linked. The trust that exists between individuals or firms within their social networks is the lubricant that allows for smooth economic performance. Economic action flows through existing social ties already imbued with trustworthiness, and long standing economic relations become overlaid with social content that carries expectations of trust (Granovetter, 1985:61). Existing network ties provide personal knowledge about the trustworthiness of a potential economic relation, and the future of a long-term relation provides the incentive for maintaining a trustworthy relation. As Granovetter (1985) has pointed out, trust is not a necessary characteristic of an existing tie. These ties often include a certain amount of distrust, and opportunistic behavior. However, existing social relations are often a necessary if not sufficient condition for trust to develop in economic relations.

The Network approach to economic organization emphasizes the web of relationships that surround an individual or firm within a productive system. The actual ties, and the position of an individual or firm within the web of ties, is the primary organizational concept. Structural position within a network can create similarities in action or attitude, as well as provide opportunities for advantage. Existing ties also

provide the means for establishing and maintaining trustworthy economic relations. Although consequences of network ties such as the development of trusting relations are an important part of the Network approach, the emphasis of the perspective remains on the structure of the network ties. This differs from the New Institutional Analysis, which considers these aspects of consciousness primary to the analysis.

New Institutional Analysis

Economic sociologists taking an institutional approach propose an alternative to selection mechanisms to explain changes of organizational populations. From this approach, firms develop organizational strategies in order to gain legitimacy, adjust to uncertainty, or control market competition (Fligstein, 1996). These strategies develop from the broader institutional context of the actors including the social and cultural milieu (Meyer et. al., 1981). The broader social and cultural milieu shape both the goals and means of actors, often putting pressures on a firm to act according to certain beliefs and expectations. Expectations can be the taken for granted understandings that make up everyday life, or they may be the constituted expectations that define certain contexts or situations (Zucker, 1988:57-9). Using these expectations, and other aspects of the cultural and social context, actors develop strategies to solve organizational problems.

DiMaggio and Powell (1983) suggest these strategies take isomorphic directions through coercive, normative, or mimetic processes. *Coercive isomorphism* result from the formal and informal pressures exerted on organizations by other organizations upon which they are dependent, and by the cultural expectations of the society within which organizations operate. The pressures may resemble a force, persuasion, or invitations to collusion. The strongest coercive forces come from the state, which forms a common

legal environment to which all organizations must adhere. Large organizations that centralize capital can impose standard operating procedures and legitimated rules and structures also. A supporting organization may compel subsidiaries to adopt many practices in order to working with them, for instance. *Mimetic processes* occur under conditions of uncertainty. Firms in ambiguous situations may model themselves on other firms deemed legitimate or successful.

Normative pressures come from the collective struggle of members of an occupation to "define the conditions and methods of their work, to control "the production of producers" (Larson, 1977:49-52), and to establish a cognitive base and legitimation for their occupational autonomy (DiMaggio and Powell, 1983:70)." Homogeneity of a profession can occur through filtering of personnel through requirements of university training, and hiring employees from within the same industry for example. Entrants that escape filtering processes are often subject to on-the-job socialization, either informally or through professional and trade associations. Normative expectations can also restrict the adaptability of some firms through *inertial pressures*. In many cases, the inability to take alternative courses of action comes from the individual's inability to even conceive of actions alternative to existing conventions. In this way, institutions do not just constrain options, but define the available preferences (DiMaggio and Powell, 1989:11). Individuals and firms are often slow to change given their interest on adhering to expectations, or their inability to conceive of alternative actions.

From this approach, trust is an institution that stems directly from the adherence to shared expectations. Actors trust each other when they believe they share a world in common, which they believe leads each to share the same background expectations.

Constitutive expectations are trusting when participants adhere to shared rules in certain contexts over time. Here, expectations of future behavior come from the knowledge of past behaviors under those circumstances. These two types of trust operate in concert. Each is present, but the degree of each diminishes in relation to the other. When background assumptions are strong, the development of constitutive trust is less important. As shared expectations rely more on a record of past actions the importance of background expectations diminishes.

Economic Sociology of Economic Organization

These theoretical approaches provide a conceptual framework to focus the analysis and examine the context of economic action in organizations. TCE focuses attention on the transaction and the institutions that facilitate transactions. OPE focuses attention on the resource niche of an industry, and distinguishes different niches. The network approach focuses attention on networks of relations rather than individual actors.

With this focus, these theoretical approaches provide concepts for examining the social influences of economic processes, and the context of economic action. In particular, these approaches draw attention to the importance of four sociological conepts for examining the development of economic institutions: 1) embedded economic action including social capital and inertial pressures, 2) imitation in economic action, 3) blocked exchanges including open and closed relationships, and 4) expectations and economic activities.

- What influence does embedded economic action play in the development of the Northwest Atlantic sea urchin industry? In particular, what role do social capital and inertial pressures play in the industry's development?

- What influence does imitation, or mimetic processes, play in the development of the Northwest Atlantic sea urchin industry?
- What influence does the existence of blocked exchanges play in the development of the sea urchin industry? In particular, how do the existence of open and closed relationships influence the development of the Northwest Atlantic sea urchin industry?
- What influence do existing expectations about economic activities and economic exchange play in the development of the Northwest Atlantic sea urchin industry?

The remainder of this dissertation examines these questions directly as it uncovers the origin and organizational dynamics of the Northwest Atlantic sea urchin industry.

The Remainder of the Dissertation

The examination of an industry, its origins, and its organizational dynamics, from the perspective of economic sociology provides a number of interesting questions for the analyst to pursue. First, I ask what kind of organizational arrangements evolved in this industry. Here I am interested in the extent to which firms use the market, form hierarchies, or use relations of trust in networks to organize productive activities. Second, I am interested in why these organizational forms developed, rather than some others. Here the theories above raise a number of interesting questions. What role do existing relations play in the organizational strategies of actors in the industry? Do these existing relations provide resource advantages, or lead to inertia? How do actors adapt to uncertainty in economic relations? Do imitation and trust play an important role in this adjustment? What influence might demographic shifts in the industry have on organizational dynamics? Are there limitations or advantages for demographic changes in the industry?

In the chapters to follow, I will elaborate on particular developments in the Northwest Atlantic sea urchin industry looking closely at the organizational dynamics of small firms in a "new" fishery. The concepts taken from Institutional Economics and Economic Sociology will help understand the evolutionary path of organizational development looking particularly at entrepreneurial processes, labor market processes and exchange processes. As the East Coast sea urchin industry was established and evolved these three processes (entrepreneurial, labor market, and exchange) combined to facilitate establishment and growth of the new industry.

Entrepreneurial and Labor Processes

Chapters 2 and 3 examine the entrepreneurial and labor processes in the Northwest Atlantic sea urchin industry respectively. Each chapter has two purposes. First, each demonstrates the advantages of embedded economic action in the entrepreneurial and labor processes. Chapter 2 examines the influence of existing social ties on the entrepreneurial process. Chapter 3 examines the unique social arrangements on the working waterfront that influence the labor process. Second, along with the importance of existing social relations on the entrepreneurial and labor process, these chapters examine the influence of inertial pressures on these processes. As this industry evolved, actors previously established on the waterfront took less interest in the industry. A demographic shift took place and entrepreneurs and harvesters without existing economic relations on the waterfront came to dominate the industry.

Entrepreneurial Processes

Chapter 2 looks at the entrepreneurs, those individuals and firms that provide a link between the supply of sea urchins on the East Coast and the consumers in Japan. Research in economic sociology finds that social relationships have a paradoxical role in the entrepreneurial process. In many cases, existing social relations provide essential resources for the entrepreneur, and differences in social ties can provide some entrepreneurs with an advantage. In these instances the actual social ties provide the entrepreneur with a resource known as social capital (Coleman, 1988). Capital most commonly refers to some form of physical or financial capital. Economists use the concept human capital to refer to an individual's skills and education that provide an economic resource (Becker, 1964). This extends the concept of physical capital embodied in tools, machines, and other productive equipment to individual persons. Similarly, social capital extends the idea of capital to find economic resources in the social relations individuals hold.

The advantage garnered by the entrepreneur comes from their position in a network of social relations, and in the qualities of the social network, they are part of. Entrepreneurs fill brokerage positions, connecting previously unconnected networks (Burt, 1993). The advantages of these brokerage positions has been shown in the employment process (Granovetter, 1981), in advancement within internal labor markets (Burt, 1997), as well as in the entrepreneurial process (Bonacich, 1973).

For entrepreneurs attempting to fill brokerage positions the quality of their relations can have an influence on their success as entrepreneurs. Cohesive ties to existing networks of social relations can increase their ability to mobilize resources in the

entrepreneurial process (Granovetter, 1985). These resources, found in existing social relations, are particularly important during periods of uncertainty associated with economic change or transition that require trust. Information about opportunities and access to certain resources (financial capital, labor force) are available to those with important ties, and unavailable to those without.

A supply of sea urchins existed on the East Coast as the Japanese demand grew. However, the link between supply and demand remained unfilled. Entrepreneurs came to make these links by establishing relations with Japanese customers. However, the entrepreneurs came from different social contexts: some embedded within existing institutional arrangements on the working waterfront, others autonomous from these institutional arrangements. Traditional entrepreneurs were already established as buyers on the waterfront and brought their existing social relationships to the new fishery. These existing relations included long-term ties with harvesters that allowed the easy mobilization of labor in the new sea urchin fishery. The second set of entrepreneurs came from outside the context of the working waterfront. Initially, these new entrepreneurs had difficulty mobilizing labor in the harvesting sector and they soon turned to buyers established in other fisheries and with ties to harvesters to secure a supply of sea urchins for their Japanese customers.

The new entrepreneurs approached the sea urchin industry motivated by growth, and without any past ties to limit their endeavors. They developed the business group and transient styles of organization and a fierce competition that contradicted many of the excepted business practices of the traditional entrepreneurs. The density of new entrepreneurs in the industry increased and soon pushed the traditional entrepreneurs

from the industry. Rather than adopt new organizational strategies, these entrepreneurs chose to maintain their existing social relations on the waterfront and leave the sea urchin industry to the newcomers.

Labor Processes

Examining entrepreneurs encourages a focus on actors in networks, and how social ties influence economic action. In chapter 3 I begin by taking a step away from the individual actor or firm, and examine the characteristics of the productive structure that make up the locality of which the actor is a part. In the inshore commercial fishing industry this is a unique set of institutional arrangements I call *the working waterfront.* Similar arrangements have been documented in Southwest Germany (Herrigel, 1990) Silicon Valley (Saxenian, 1994) and Northcentral Italy known as industrial districts (Piore and Sabel, 1984; Sabel and Zeitlin, 1985; Sabel, 1991). Perhaps the most well documented industrial districts come from the Emilia-Romagna district of northern Italy where a number of products are produced including textiles, ceramics, motorcycles and shoes (Brusco, 1982; Piore and Sabel, 1984). Though popularly well known for its economic success, economists and sociologists find the unique productive arrangements that have developed among firms most interesting.

Brusco (1986) has examined the characteristics of industrial districts that distinguish them from other forms of economic organization. In contrast to traditional artisans that produce for small local markets, small firms in industrial districts produce for national and international markets. The level of worker skill and the capacity to innovate when confronted with specific productive problems is high in industrial districts and often leads to new markets for products. Production takes place through the

collaboration of thousands of small firms rather than large hierarchical firms. Exchange relations develop between firms for the many stages of production, and firms are not dependent on single buyers for their work. A final indicator of industrial districts is the presence of firms that produce the machinery necessary for the production of particular commodities.

In the industrial district, resource allocation and transactions flow through networks of small-firms linked by reciprocal mutually supportive actions (Powell, 1990b:317). Perrow (1993) captures the small-firm network form of organization:

> Imagine breaking up the Integrated Firm into units whose average number of employees is ten each. Instead of 2,000 employees in one firm, for example, there would be 200 firms of ten employees each...The firms interact with each other, sharing information, equipment, personnel, and orders, even as they compete with one another (385-6).

The independent firms are held together in productive relationships based on cooperation and trust, and at the same time relations can be easily ended and reestablished while adapting to environmental changes (Thorelli, 1986). Powell (1990a) describes networks as "lighter on their feet" than hierarchies, and more easily adapting to uncertain supply and demand environments. In his study of the textile industry in Northern Italy, Lazerson (1993) found this adaptability a result of the organizational diversity of the region. One firm individually might not adapt easily to a particular market change, but with a variety of firms present, at least some can accommodate most opportunities that arise. Lazerson also finds support for the open labor markets described by Sabel (1991); laborers are attached to firms through informal ties, while simultaneously anticipating changes in their existing economic ties. This anticipation requires a deep enmeshment in local community, friendships and family networks in order to forecast the contraction and expansion of future opportunities.

In Chapter 3, I examine a similar set of productive relations in the inshore fisheries along the East Coast. The unique productive relations a part of the working waterfront rely upon State managed ocean resources, technical flexibility in production, a knowledge base developed through long-term experience working on the waterfront, and cooperative relations that encourage a social flexibility of production. These unique productive arrangements have an important influence on the labor process of the waterfront, allowing established and non-established harvesters to take advantage of opportunities like the new sea urchin fishery easily. Both established and non-established harvesters moved into the new fishery, but they did not share the same interests in the sea urchin. Similar to the traditional entrepreneurs in Chapter 2, inertial pressures kept harvesters already established in other fisheries from dropping existing relations in favor of the sea urchin fishery. These harvesters saw the sea urchin fishery as a supplement to their primary fishery, and remained in this fishery as long as it did not conflict with that work. Non-established harvesters did not have the inertial pressures associated with existing relations and therefore approached the industry differently. For young fishermen coming from coastal communities the sea urchin fishery was a chance to establish themselves in commercial fishing with the sea urchin as their primary fishery. A third group of harvesters came from outside the waterfront context, and was attracted to the industry by the opportunities provided, and the little barrier to entry.

Imitation

Chapters 2 and 3 each contain examples of imitation or mimetic pressures in the economic processes. Imitation is a type of embedded action that helps deal with the problems of uncertainty. In uncertain situations, economic actors often follow the

decisions and strategies of friends, neighbors, business associates, and competitors whom they deem successful. I found this type of action in the entrepreneurial process as new entrepreneurs entered the inshore commercial fisheries. Without previous experience, they had to imitate and innovate organizing strategies in the industry. Their models were often other new entrepreneurs with whom they competed. Similar imitative behavior occurred in the labor process as new harvesters mimic established harvesters as they develop inshore, commercial fishing career strategies. In many cases, these models were family members, or close friends and neighbors.

Exchange Processes

Chapter 4 looks at the exchange processes between harvesters and dealers in this new fishery, looking particularly at the role of trust—the mutual confidence that no party to an exchange will exploit the other's vulnerability. In any industry, it becomes necessary to coordinate exchange between the essential activities of the productive system. Individuals and firms coordinate exchange within a productive system through markets and price, authority and hierarchies, or networks and trust. Previous research on the inshore fishing industries of Maine and New England finds network organization playing a prominent role.

In New England's fresh fish market, Wilson (1980) found exchange between harvesters and coast-side dealers based on trust and reciprocity. Reciprocitive relations benefit both dealers and sellers by decreasing the amount of uncertainty in their business operations. The dealers business requires a constant supply of reasonable quality fresh fish in order to fill his client's requests. The fishermen's business interest lies in securing a fair price for his catch. Buyers commonly have better information about the current

market value of a fisherman's catch, and could use this to take advantage of the harvester. However, the fisherman can always withhold future supply from a buyer who cheats on a deal. The threat holds weight given the buyers need for a constant supply.

A long-term relationship between buyer and harvester helps solve some of these exchange problems. For the buyer, a long-term relationship helps assure a constant supply of groundfish. These arrangements allow the buyer some certainty in the quality of fish he will receive, and a source to which he can always turn. The long-term relation lasts given the harvesters assurance of a fair market price for his catch.

Wilson finds that other trust dependent relations develop from these long-term relations. Fishermen get better access to market information, can base equipment upgrades on assured future sales, and can expect fair evaluation of quality and price for the catch. A buyer may pay slightly above market price for fish in order to assure a positive return on the vessel's trip. These steps assure future supply, and perhaps gain the buyer's influence on timing of future effort and species.

Acheson's (1988) research on Maine Lobstermen finds long-term reciprocal ties in the lobster industry as he follows the marketing chain from harvesting to the consumer. Lobsters reach the consumer through a complicated set of exchanges between harvesters, dealers, pounds, wholesale distributors, shippers, and retailers. The primary production problem in the lobster fishery is an uncertain supply and demand. For instance, a dealer must balance a supply of lobsters from fishermen on one side and demand from consumers including restaurants, hotels, and wholesalers on the other. The fisherman harvests an uncertain supply of lobsters each day, but demands payment for their catch on the spot. Consumers make a steady demand for lobsters from the dealer, preferably at a

steady price. A dealer may have to buy a fisherman's lobsters for which he does not have a demand. In addition, he may have a larger demand than the fishermen are catching on a particular day.

To balance supply and demand firms develop long-term reciprocal relations (Acheson, 1988:119). Wholesalers know that their dealers will attempt to fill demands during times of scarcity, and the dealer knows the wholesaler will buy as many lobsters as possible during times of overabundance. Firms in the industry know that the other operations they work with will go out of their way to fulfill the informal arrangements to balance supply and demand in a way that is best for both parties. Similarly, harvesters and dealers establish long-term relations that have mutual benefits. The dealer attempts to attach fishermen to his firm to assure a steady supply of lobsters for his customers. In return, the fishermen gets an assured buyer of his catch, and often times supplies such as fuel and bait with little or no mark up.

In the Northwest Atlantic sea urchin industry some exchange relations resemble those found in the groundfish and lobster fisheries, long-term reciprocitive exchange relations. However, for most exchanges between harvesters and cost-side dealers expectations of distrust have developed. These expectations contribute to the non-exclusive, market like exchange relations between harvesters and coast-side dealers. The exchanges have indeterminate outcomes, and opportunistic behavior is rife—conditions that might lead to cooperative, trust based exchange relations following the TCE approach. However, these inefficient exchanges persist because the participants to the exchange expect opportunistic actions by participants to the exchange, and are unable to overcome these expectations.

Chapters 2 through 4 look in more detail at each of these economic processes and the social pressures that influence these processes. Following these processes I will document the organizational arrangements present in this unique resource niche, and provide an explanation for why these arrangements developed rather than some other. Below, I discuss the empirical sources and methods used in the chapters to come.

Empirical Sources and Methods[16]

At a point in every project a researcher must make decisions about the techniques for collecting data, and consider the ways these techniques relate to the questions driving their research. The research for this analysis is ethnographic in nature, with the empirical material accumulated from multiple sources collected during the period from July 1996 to April 1998. I chose the set of techniques associated with the ethnographic approach to social phenomena for the flexibility it provides the researcher.

Along with ethnographic techniques, I chose to conduct a case study, or what Tilly (1984) calls an individualizing comparison. Choosing an individualizing comparison limits my ability to test theories, but the choice provides a unique way to illustrate the value of theoretical concepts while illuminating the particularities of this case. As I delve into separate characteristics of the case in each chapter, the analysis becomes comparative—not at the level of the industry, but in terms of categories of the relevant phenomena (entrepreneurs, harvesters, and exchange relations). This analysis resembles what Tilly (1984:154) calls variation finding, "establishing a principle of variation in the character or intensity of a phenomena having more than one form." So,

[16] This discussion of empirical sources and methods can be read with equal value at this point, or after reading the remainder of this dissertation. I would encourage continual reference to it. As the reader will

rather than examine *the* entrepreneurial process in the industry I examined three different forms of entrepreneurial activity in the industry and characterized the differences and consequences of the forms.

Below I provide more detail about the specific data sources used in the analysis. Following this I provide an example of how I combined these multiple sources to examine one research question. Finally, I give some further justification for choosing this research approach rather than the more formal techniques associated with testing theoretically derived hypotheses.

Empirical Sources

Quantitative Data

The data used in the analysis are not solely qualitative. There are a number of quantitative sources of data throughout the analysis. Using data collected from the Food and Agricultural Organization of the United Nations Annual Yearbook of Fisheries Statistics I constructed a time-series data set that covers the years before the emergence of the sea urchin industry to the present. The data set includes variables such as Maine landings, Japanese landings, world landings, and the yen dollar ratio used to create many of the graphs and tables found in the Introduction.

The Maine Department of Marine Resources (DMR) provided other sources of quantitative data. First, from the DMR licensing procedures I have constructed data sets on the harvesters, dealers, processors, and exporters in the industry. I have described many of these data sources in the Introduction. There are some limitations. For example,

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see, some of this current discussion will reference analyses to come. The insight of the current discussion may increase after familiarity with some of the analyses in chapters to come.

the data gave only limited information on the diversity of dealers in the industry. DMR uses a blanket dealers' license for any firm that buys or transports sea urchins in the state. This includes many processors and wholesalers along with independent coast-side dealers. In addition, some Canadian firms solely transport sea urchins to Maine processors. Non-recognized dealers further complicate the estimation. In 1997, DMR recognized 80 dealers, 19 of which are processors. It is not unreasonable to assume that each area includes at least one or two unrecognized dealers, which might lead to estimates of over 100 coast-side dealers.

Other quantitative data includes Dealer Logbooks collected by the Maine Department of Marine Resources (DMR). During the 1996-97 season, the DMR required that dealers record every transaction between sea urchin harvester and buyer in logbooks. The logbooks include: purchaser name, location of transaction, the date of transaction, the harvester's identification number, amount in pounds purchased, a product quality measure, and price per pound. This data source provides a unique resource to analyze the organization of the industry, especially the extent of long term relations, and exclusive relations.

Using the logbooks completed by coast-side dealers provides some insight into the nature of transactions in the industry found in Chapter 5. Each month every licensed dealer is required to turn in a logbook to the DMR. Having a record of all transactions has obvious advantages in this type of research. There are some flaws with using there data, however. Dealers have been compelled to fill out these logbooks by the DMR. Although landings and costs should accurately reflect their tax records, there is no way to check that dealers accurately represent a harvester's catch. In fact, it seems likely that a

dealer would misrepresent individual harvester information. Similarly, harvesters are likely to misrepresent the information provided for dealers. More than one harvester will often sell their catch under one license number, and harvesters can provide inaccurate license information easily. In the busy atmosphere of the market, exact records are often lost. However, for the questions that I ask these measurement problems favor the conclusions reached using the data. If records that are more accurate existed, we would expect the number of buyers used by a harvester to increase, and the percentage of catch going to a primary buyer to decrease. These changes would further highlight the frequent switching that occurs in the industry.

Archival Research

There are a number of secondary sources on the sea urchin industry including NMFS, NOAA, and DMR reports on the industry, newspaper stories, and scholarly research on world fisheries and the Japanese economy. These sources gave me important background to the ecology, management, and development of markets for Maine's green sea urchin. Although I cite many of these reports within the dissertation, I have included them in a separate appendix.

Since the early 1990s, the Maine State legislature has taken notice of the sea urchin fishery. This has resulted in proposed legislation and some public hearings. The legislature asks for written submission of all testimony at public hearings. I spent a number of days at the Maine State Legislative Library taking notes on the past testimony and following the political processes in local newspapers.

Direct Field Work

I have become intimately involved with the industry through a number of field experiences. Perhaps most significant has been my attendance at Sea Urchin Zone Advisory Council (SUZAC) meetings. These meetings take place once a month and I attended them regularly from June 1996 to April 1998[17]. The meetings addressed a variety of management issues in the sea urchin fishery. The council included approximately 15 regular participants, including members of DMR, marine biologists from the University of Maine, sea urchin draggers, divers, dealers, and processors. The council members represent many regions of the state and stakeholders in the industry. Often non-council members attend the meetings as well.

Through my attendance, I became familiar to the regular participants. The meetings provide intimate knowledge of the concerns of participants in this fishery and the problems encountered in attempts at management. I engaged in many informal conversations with participants before and after these meetings as well. Similar to the experience at these SUZAC meetings, I attended all public hearings on the sea urchin fishery legislation that took place during the period of my fieldwork. These meetings also attracted participants from a variety of sectors of the industry and the discussion and debate at these meetings gave insight into the industry. During the period of my fieldwork, I also attended two meetings of the Maine Urchin Harvesters Association, and I attended two meetings of the annual Maine Fisherman's Forum.

Throughout my research I spent time in particular communities and learned about the sea urchin fishery in that area. This included spending time at the public piers as boats come in, talking with participants in the industry working in the area, and visiting

processing plants. By spending time in a community, I did not mean to undertake research in the tradition of a sociological community study. Instead, this time allowed me to examine the economic activities of participants in relation to other participants. With my examination of exchange processes, for instance, I was able to interview both buyers and sellers in an area, and observe their regular economic activities day to day. This added understanding of the process that might have been lost by interviewing only one side of the exchange and not witnessing the actual activities of the industry.

These fieldwork experiences in particular communities did not follow formal methods. In choosing communities, I was trying to take account of the diversity of activities that occurred in the industry. I chose areas with sea urchin activity, including harvesters, dealers and processors working in the industry. Two of the areas included public piers with spot-market exchange-relations taking place regularly. In each area, I spent from one to three weeks. I would return regularly to some areas during the period of my fieldwork. In each area I would secure interviews with participants in the industry, and spend each day at a pier, in a processing facility or engaged in other activities associated with the industry.

Through contacts made in the field experiences discussed above, I conducted informal interviews with marine biologists, DMR officials, divers, draggers, dealers, and processors. These interviews were not formally structured. At times, I directed the conversations towards subjects of interest to the research and often they took the direction respondents chose to discuss.

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[17] Approximately 20 meetings total.

Semi-Structured In-depth Interviews

To supplement the quantitative and qualitative analysis discussed above I conducted in-depth semi-structured interviews with participants from a variety of industry sectors. I began selecting respondents on a theoretical basis, attempting to capture the variety of experiences by including participants in the different sectors of the industry. Here I wanted to include harvesters, coast-side dealers, and processors in my sample, as well as participants from different regions of the coast. To contact particular respondents I typically used snowball-sampling techniques. However, I often selected respondents purposefully when personal reference did not suit the theoretical sample goals. Here I used more formal means (letters, telephone calls) to secure interviews. As my research developed, I also selected respondents analytically. As certain patterns and themes developed during the research, I attempted to sample respondents that might bring contradictions in these patterns to light[18]. This was not an abandonment of the theoretical goals stated above, but rather a supplement to them. **Table 1.2** provides some further detail about the variety of respondents interviewed.

Table 1.2 Semi-Structured In-depth Interviews

- **41 semi-structured in-depth interviews**

- **5 women**
- **36 men**

- **17 Harvesters**
- **11 Divers**
- **6 Draggers**

- **26 Dealers or Processors**
- **10 Dealers involved in some processing**
- **6 Dealers supplying North American processors**

- **14 South Shore respondents**
- **8 Mid Coast respondents**
- **19 Down East respondents**

[18] See Linking Research Questions and Empirical Data below.

These interviews typically lasted from one to two hours. Each interview was taped and transcribed for future use. The **Appendix** includes example interview guides I used while conducting these interviews. I did not follow these guides rigidly during the interviews. Instead, they were to remind me of subjects I meant to cover at some point during the interview, and to help me prepare for interviews. Any one interview might follow a number of directions, covering issues in different sequence, and covering issues not set out in the interview guide. At the end of the interview guide I include a set of actual questions I might ask during the interview in order to obtain the information included in the guide. These questions helped establish a conversation. I obtained most information through probing with follow-up questions.

These interviews provided important information about the relationships created in these early years that linked the Japanese demand with the Maine coast. Analysis of these data also helped determine how exchange relationships develop in the sea urchin industry, how exchange partners negotiate issues of trust, and how these relations vary in exchange between different sectors of the industry. The semi-structured aspect of the interview allowed me to pursue particular subjects of interest to the research. The in-person and open aspects of the interview allowed me to probe respondents about their goals and frames of reference when they took particular actions related to the industry[19].

Linking Research Questions and Empirical Data

I did not organize this research design around a formal test of research hypotheses, but this does not mean research questions are not subject to empirical scrutiny. Perhaps I can best demonstrate this with an example from the research.

[19] See **Appendix A** for examples of interview guides used in these interviews.

Consider the question, Where did the East Coast sea urchin industry begin? The question is part of the particular narrative of the industry, but not one derived from theory. When starting my research I was interested in the industry's origins and its quick growth, but I was not concerned with pinpointing who started it or where it started. However, an initial look at newspaper articles about the industry, and informal discussions with some participants, put the beginning of the industry in Portland. There, Nicholas Cummings was the first to export urchins to Japan, and soon after Jack Chan was the first to process urchins.

My research soon led to evidence contradicting this conclusion. I first began questioning this origin at the Maine State Legislative Library where I was looking through old newspapers from the many communities along the coast. Here I found a few short articles about the new sea urchin fishery starting in smaller communities along Maine's coast where entrepreneurs were exporting and processing sea urchins. These stories came at the same time the industry was starting in Portland. Motivated by this new information, I adapted my interview sampling design to include some of these early entrepreneurs and their early involvement in the industry as well as the Portland area entrepreneurs.

I began to develop a different picture of the industry's origins, a more diffuse origin than I initially found. Later in the research process, while analyzing my data from interviews and other sources, I returned to the questions of industry origins. I now had a diffuse image of the origins of the industry, but I reconsidered the prominence of Cummings, Chan, and other entrepreneurs from the Portland area. While not the sole initiators of the industry, their approach to organizing production did play an important

part in the evolution of the industry. While it was still not theoretically essential to know who started the industry, these entrepreneurial processes did have relevance to questions in economic sociology. Eventually the research directions and analyses that I have just described develop into the analysis in Chapter 2.

This brief description of one line of research shows the flexibility of the ethnographic methods, how the research can triangulate multiple data sources to answer research questions, and the way questions are subject to empirical review. Before following the lead provided by the newspaper articles, I was not aware of the different kinds of entrepreneurship in the industry. Tracking down this lead, I became aware of the inertial pressures on traditional entrepreneurs that did not affect the business group entrepreneurs from Portland. The flexibility of the ethnographic techniques allowed me to pursue this research direction, and uncover one of the more interesting findings of the research. The triangulation of data encourages flexibility as well. Perhaps my theoretical sample of interview respondents would have turned up this finding. However, the flexible use of triangulation helped to assure this finding did not go unnoticed.

The triangulation of data in this example highlights, also, the iterative testing of hypotheses in this approach. In order to bring some coherence to the empirical data I collected, I would attempt to apply some conceptual schema to the findings. In this case something as simple as where the industry started. From here evidence either lends credence to the schema, or contradicts the schema. In some cases, the evidence comes through the immersion in the empirical material, such as finding the newspaper articles. In other cases, I purposefully collected data looking for contradictory evidence, such as interviewing entrepreneurs from outside of Portland. I would resolve the contradictions

by re-conceiving the schema. As more evidence accumulates, and I modified the schema, fewer contradictions from evidence arise. This is not formal testing of a hypothesis found in standard techniques. However, in a similar fashion, interpretations are posed, and contradictions with empirical evidence are resolved through observation and reasoning.

Justification of Research Design

More traditional research designs in economic sociology share the strengths of the traditional approach to social research: reliability, statistical inference, and the clear link of theory and research through formal hypothesis testing. There are examples of more formal methods used in economic sociology. For example, Fligstein (1991) uses quantitative analysis in the formal sense of testing a model in his research on the spread of diversification as a firm strategy. He uses the top 100 businesses in the US at different times throughout the last century as the population. He uses logistic regression with control variables to predict the adoption of the diversification strategy.

Network analysts have also refined formal methods including block models (Burt, 1983; DiMaggio, 1986). Mapping clique networks is a descriptive type of network analysis. Cliques describe actual ties based on the exchange of resources, information, or face-to-face interaction. They map the set of social ties that form an actual network. When the number of ties and actors in the analysis increase mapping all ties can become quite difficult and offer little simplification of analysis. DiMaggio (1986) encourages the use of block models, or structural-equivalence models to analyze organizational fields that include a large number of firms. Structural-equivalence models group actors that share equivalent network positions whether or not they actually share network ties.

DiMaggio (1986) shows how to use the block model approach to determine influence within an organizational field.

These research designs have certain strengths, but they also restrict the researcher by requiring them to define specific testable research questions, specific data sources and potential answers before the research begins. While these requirements are the strength of the approach, I hoped to accomplish different goals in this research. I found the ethnographic approach uniquely suited to this case study. It allowed me to examine the case holistically, and to use multiple sources of data as they applied to diverse research questions. In addition, ethnography allowed the primary research questions to emerge from the particular phenomena of the case. In this way, theoretical questions and empirical research interacted continuously throughout the project.

Taking the ethnographic approach is not unique among social scientists that examine similar social phenomena. Acheson (1988) interviewed over 190 fishermen in over ten years of studying the lobster industry of Maine. His work included collecting profiles of New England harbors, observation while visiting work cites (including fishing trips), and examination of three Maine fishing communities – one in particular depth. Wilson's (1980) research included 5 years of intimate contact through fieldwork with the fresh fish market. Doeringer, et al. (1986) design a project they consider unique in the economic literature by blending "traditional economic data with field interviews, original survey data, and analysis of economic institutions (9)." They conducted interviews with participants from a number of sectors of the industry, local officials and members of government agencies, and a number of other actors working in and around the New England groundfish industry. Similar to Acheson's work, they too examine two

communities in-depth. Apostle and Barrett (1992) use similar methods working with a team of anthropologists and sociologists to analyze the Nova Scotia fishing industry. Anthropologists conducted four case studies of communities and institutions. Survey research on plant managers, plant workers, and boat captains complemented this ethnographic work. They placed this research within a detailed historical context of the Nova Scotia fishing industry.

Researchers take similar approaches outside fisheries research as well. Coser et al. structure the bulk of their research on the publishing industry around 85 interviews conducted at 56 different publishing houses. They chose their sample purposefully to include different industry sectors and different structural positions such as size and location. They also take advantage of "snowball" type interviews with respondents who they get the chance to interview, or whom others say they just have to talk to. They selected ten firms for participant-observation based on the sector and structural variables described above The researchers spent time at the publishing house taking part in the regular activities of that work, talking with workers, and doing some small scale survey research. Friedland et al. use existing statistics to examine economic institutions within the lettuce industry. In his research on the knitwear industry in the Emilian-Romagna region of Italy Lazerson (1988,1993) conducted semi-structured open-ended interviews with representatives from 44 firms: 16 manufacturers and 28 subcontractor-artisans. He selected these firms through contacts made with three industry associations in the region. Lazerson conducted his interview work in tandem with participant-observation at two firms where he spent several days shadowing work in the firm. The final analysis found

in this dissertation is limited by my choice not to follow a traditional research design, but I feel equally strengthened by that choice.

CHAPTER 2

ENTREPRENEURIAL PROCESSES

IN 1985, THE GREEN SEA URCHIN WAS LITTLE MORE THAN A NUISANCE TO LOCAL fishermen. They clogged the traps of lobstermen creating extra work. Perhaps more important, sea urchins threatened the coastal ecology by damaging kelp beds that provide food and shelter for other fish essential to local economies. This changed when the "trash" fish became a commodity rivaled only by the lobster fishery in value. This chapter addresses the social construction of a sea urchin industry that changed this trash fish to a treasure and the organizational dynamics that occur as inshore fisheries become part of a global productive system. In particular I look at the initiation of entrepreneurial relations to link supply and demand. I examine who took these entrepreneurial steps, from what contexts they emerged, and how the actual steps took place.

The linking of supply and demand is a social problem. Actors confront and develop solutions to the problem based on their social context, bringing advantages and disadvantages to the problem. This analysis of the entrepreneurial process begins by introducing three distinct types of entrepreneurs: traditional entrepreneurs, business group entrepreneurs, and transient entrepreneurs. Each type of entrepreneurs differs in the way they confronted the problem of linking supply and demand.

Following this introduction, the remainder of the chapter shows how these forms came to participate in the new industry, and the dynamic relations between these entrepreneurial strategies as the industry developed. The analysis highlights three distinct

social processes that lead to the current mix of entrepreneurial strategies in the industry. First, the analysis compares traditional entrepreneurs already established on the waterfront with entrepreneurs new to the inshore commercial fishing industry. Traditional entrepreneurs held an advantage over these new entrepreneurs in the early stages of the industry because of their existing ties on the waterfront. Second, the analysis examines the organizational strategies of new entrepreneurs to the waterfront. Not already established on the waterfront, these entrepreneurs followed a process of innovation and imitation as they developed organizational strategies in the sea urchin industry. These strategies led to an expansion of production and competition in the industry. Finally, the analysis returns to the traditional entrepreneurs. As the new entrepreneurs transformed the industry competition required a change of organizational strategy on the part of the traditional entrepreneurs. Unwilling to make that change due to inertial pressures, these entrepreneurs chose to drop from the industry and maintain their traditional entrepreneurial strategies.

Entrepreneurial Activity and Organizational Strategy

In 1987, a Japanese businessman came to Smallport, a small downeast town on the coast of Maine, and walked down to the Avery Lobster wharf. The Avery family began buying lobster on their wharf in 1919, and the business had been handed down for three generations. On this day, the Japanese businessman came with a proposition—he suggested they start a sea urchin processing plant on the property just off their pier. Avery Lobster would manage all aspects of production in the US. The Japanese would pick up the product in Boston and ship to Japan. At about this time Robert Thompson was exploring the possibilities of his own export business with a trip to Japan. Thompson

was in the insurance business and he wanted to get out. He was considering the viability of exporting traditional Maine goods—blueberries, handicrafts, and Christmas trees—when an official at the US trade department in Tokyo introduced him to a man interested in buying sea urchins. Thompson would buy the live sea urchins in Maine and bring them to Boston. There the Japanese would take over, shipping them to a Japanese processor. Both the Avery family and Robert Thompson began buying sea urchins for Japanese customers that year. The two were very different—one a family firm with a long tradition in the seafood industry, the other a newcomer to commercial fishing looking for the opportunity to run his own business. Ten years later, Robert Thompson remained in the industry while the Avery family dropped out.

Entrepreneurs generate profits by mobilizing resources, such as labor and capital. In Schumpeter's ([1926] 1934) definition entrepreneurship involves pulling together previously unconnected elements for an economic purpose. Using the network analogy, Burt (1993) applies this directly to a position in a network—entrepreneurs generate profit from being between others. He calls this position a structural hole. In this definition, the entrepreneur is a broker between two or more networks that would not otherwise have contact. Entrepreneurs fill a structural hole in a productive system, forging the link between supply and demand. Both the Avery family and Robert Thompson took advantage of entrepreneurial opportunities, but clearly they are different kinds of entrepreneurs. The economics and organizational ecology literature expects entrepreneurial activity to naturally develop under favorable environmental conditions. If markets open and barriers are removed entrepreneurs will simply emerge, or in ecological terms organizational founding rates will increase. Perhaps this is true within the broad

sweep of the predictions. However, existing resource conditions may make industry formation feasible, but the resources must be assembled by entrepreneurial actors (Stinchcombe, 1968). The economic and ecological predictions do not help understand who the entrepreneurs are, what contexts led to their emergence, or how they organized to take advantage of the opportunities presented to them.

Organizing an Industry

In the analysis that follows, I look at the entrepreneurs who organized the Northwest Atlantic sea urchin industry. These entrepreneurs share a structurally equivalent position in the productive system. Each provides a link to the Japanese market for sea urchins through ties with Japanese import companies. Here I am not interested in the psychological characteristics of the individuals, but instead in the social context from which they emerged. These social contexts influence entrepreneurs' organizational strategies and consequently the evolution of the industry as a whole. There appear to be three distinct types of entrepreneurs that emerged from the favorable circumstances of the 1980s. The first group, resembling the Avery Lobster Company, follows a traditional inshore fisheries production strategy. The second type appears to resemble more closely the entrepreneur from economic literature. Similar to Robert Thompson, these individuals are looking for business opportunities without any previous experience in the inshore fisheries. A third type of entrepreneur resembles the ethnic entrepreneurs frequently documented in the sociological research (Aldrich and Waldinger, 1990; Light and Karageorgis, 1994). These are Cambodian and Vietnamese refugees attempting to establish themselves in a new country through entrepreneurial activity. Before describing

these three types in more detail, I examine the economic and political contexts of their emergence.

Economic and Political Conditions

Favorable economic and political conditions for the development of an international export industry like the sea urchin industry did exist in the 1980s and in Maine where the Northwest Atlantic industry started. The weak dollar and strong yen made it valuable for Japanese businessmen to import goods from the US. But who were these Japanese businessmen? Some of the Japanese represented processing companies based in the Hokkaido region of Japan. The Japanese sea urchin industry is primarily concentrated in Hokkaido where a number of processors operate. These processors buy the green sea urchin on the Northwest Atlantic coast and ship it live to Hokkaido to have it processed by Japanese workers. Wealthy Japanese consumers prefer uni processed by Japanese workers, and pay a higher price for this product[20]. Another set of Japanese buyers acts as broker for the processed sea urchin product. The Japanese brokers handle transport of the product to Japan and selling the product on the Tsukiji auction floor for a fixed fee based on quantity.

Many of the Japanese came representing Japanese trading companies known as sogo shosha. The primary business of the trading company is linking buyers and sellers in a productive network. These Japanese production networks, in which larger companies contract out production to a complex network of suppliers, are known as *keiretsu* (Miwa, 1996;Nishiguchi, 1994;Yoshino and Lifson, 1986). Yoshino and Lifson

[20] An exporter's Japanese customer once asked if any American's hands had touched the sea urchins before they reached Japan. "Do they think we wish them into the boxes!" he asked. This gives some sense of

(1986) have called the sogo shosha an "Invisible Link" in international productive systems because of the way they oversee production by obtaining supplies of raw materials for Japanese producers, and handling distribution of the final products. The sogo shosha establish long-term relationships among many small suppliers and producers and hold them together to form a large, often international productive system.

Strategies of expansion and competition motivate the sogo shosha (Yoshino and Lifson, 1986:26-33). They have practiced an expansion strategy in most productive systems in order to limit dependence on one region for raw materials. Initially in the steel industry, for instance, the Japanese steel processors were largely dependent on the United States for coking coal. In order to broaden their resource base the sogo shosha developed new sources in Canada and Australia. Competition between trading companies follows the "one finger in every pie" principle (Powell and Smith-Doer, 1994). Rival trading companies compete fiercely, and as one diversifies into a new industry, others follow quickly in order to maintain competitive position.

The Japanese were already well established in the North American West Coast sea urchin fishery by the 1980s, but little interest had been shown on the East Coast. However, in 1979 the state of Maine, following the moves by the federal government to increase exports to Japan, began to initiate ties with Japanese companies interested in Maine seafood products. The first sign of this came with a trade mission to Japan sponsored by the federal government. A part of the mission was devoted to seafood, and two representatives from Maine accompanied the mission. The former Governor Kenneth Curtis and James Warren, executive director of the Maine Sardine Council,

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the Japanese taste for seafood. How the product is processed, and its presentation is as important as taste in providing value.

accompanied US Secretary of Commerce Juanita Kreps on the mission, which primarily attempted to reduce tariffs on seafood[21].

The work of John Gardener of the DMR marketing and promotion department was at the center of a second attempt at establishing an export industry with Maine seafood products. Initial marketing to Japan focused on squid and tuna in particular, with sea urchin only a secondary interest. Gardner organized a fisheries trade workshop inviting representatives from Japanese firms and local representatives from the commercial fishing industry. The Japanese in attendance were ready to invest in relations with the local fishing industry. This included sending Japanese fishermen out on boats to teach fishing techniques, providing technicians to help train fishermen in skills to handle the squid, and they had established airfreight lines to handle the cargo. After the meeting, a Japanese representative agreed to ship Maine seafood products to Japan for free on Flying Tiger Airlines and display them at the Tsukiji auction. A week after the workshop a Japanese expert working in the West Coast sea urchin industry was invited by Gardner to tour local processing plants exploring the commercial potential of the green sea urchin[22].

These efforts did not spur the development of a sea urchin industry at the time. Three years later officials were still calling for a new approach to commercial fisheries with a focus on export of unusual species to Asian markets, particularly Japan[23]. It was

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[21] "Maine fish may not hook Japanese." by Frank Sleeper. Portland Press Herald, Jan. 11, 1979

[22] "Exotic Tastes: Japan snaps up Maine's 'trash fish'" by Mike D'Antonio. Maine State Times, Jan. 7, 1979; "Maine fish may not hook Japanese." by Frank Sleeper. Portland Press Herald, Jan. 11, 1979; "Japanese expert to study Maine sea urchin as food." By Clark T. Irwin Jr. Portland Press Herald, Jan. 17, 1979

[23] "New approach to U.S. seafood industry urged." by Dieter Bradbury. Portland Press Herald, June 25, 1983

not until the mid-to-late 1980s that export to Japan really took off and the Northwest Atlantic sea urchin fishery started to develop.

Traditional, Business Group, and Transient Entrepreneurs

In many cases, Japanese businessmen approached individuals on the Maine coast asking them to cooperate in the production of green sea urchins for the Japanese market. A common choice for the businessmen was to approach an existing buyer of inshore fisheries products along the coast. Inshore fishermen and buyers share unique productive relations based on reciprocity and flexibility. Fisheries social scientists have documented the prevalence of long-term relations between fishermen and buyers in inshore fisheries (see Acheson, 1981). Wilson (1980) finds these relations based on a mutual benefit; long-term ties can assure a supply for the buyer and a fair price for fishermen. Given the uncertain supply of fish and changing market circumstances, inshore fishermen and buyers also share a flexible relationship. They work in a number of different fisheries and switch species based on season or market (Dewar, 1983,1986). Wilson (1980) found that the long-term reciprocitive ties that develop between buyers and harvesters allow the flexibility Dewar (1983,1986) describes. It is the trust that holds the partners together that allows them to move easily into other markets and species.

These inshore entrepreneurs organize according to regions also. They are associated with one of the many ports along the coast, work with the harvesters in that region, and do not compete directly for supply with inshore buyers in other regions. In some cases, they even cooperate with buyers in other regions nearby. This offers a contrast to the second type of entrepreneur that employs a business group organizational strategy (Granovetter, 1994). A business group is a network of firms that regularly

collaborate over a long period of time (Powell and Smith-Doer,1994:388). The boundaries of the group are stronger than other production networks, and the members are a recognized group although they are autonomous firms. The business group entrepreneurs buy a larger quantity of sea urchins, and do not follow the regional divisions of the inshore entrepreneurs. Instead, these entrepreneurs set up a series of buying stations along the coast in order to have a presence in as many regions as possible. They typically buy directly from harvesters in one region of the coast, and then have other buyers working with harvesters in other key regions along the coast. Each of these buying stations is formally recognized independent of the large buyer, but sells their product exclusively to this larger buyer. The members of a group do not compete among each other, and in the region the buying station operates, industry participants know what business group the buyer works within.

A third group of entrepreneurs emerged from the Cambodian and Vietnamese refugee community in Portland and has adopted a transient organizational strategy. The transient buyers do not work in a single community where they have long standing relations, nor do they organize independent buyers to work in specific communities. Instead, they travel to ports along the coast without developing ties to a specific area. A transient entrepreneur may settle in one port for a while, but it is not unusual for them to move regularly from port to port.

This typology summarizes three different organizational forms entrepreneurs use to secure a supply of sea urchins for their Japanese customers. Below I attempt to show how these different organizing strategies developed, and how they interacted to reach the industry structure that dominates currently.

Establishing Ties and Mobilizing Networks

The analysis below examines the entrepreneurial processes at the early stages of the Northwest Atlantic sea urchin industry. These entrepreneurs share a structurally equivalent position based on their ties to the Japanese. The first obstacle for the entrepreneur to overcome was the establishment of ties with the Japanese. In some cases, the Japanese approached the entrepreneurs that came to operate in the industry. In others, entrepreneurs sought out the Japanese customers in order to get started in the industry. Once ties to Japan were established, entrepreneurs encountered the problem of mobilizing labor to secure a supply of sea urchins. It is possible to distinguish two different types of entrepreneurs at this stage based on their ties to the inshore commercial fishing industry along the coast. The traditional entrepreneurs held ongoing relationships on the waterfront. These existing ties gave them a social capital advantage over new entrepreneurs without those ties in the mobilization of labor to secure a supply of sea urchins.

Establishing Ties to Japan

There is some record of a small amount of sea urchin landings for many decades prior to the middle 1980s. These landings primarily supplied a small domestic market for sea urchin roe in ethnic communities of large cities. Always remaining very small, inshore buyers sold these urchins in urban fish markets such as the Fulton Fish Market in New York City. The market was never more than a small, part-time operation for harvesters and buyers, however. Harvey Holtz, for example, did a little work in this market. He mainly SCUBA dived in the mussel fishery. He harvested, and had his own contacts at the Fulton Fish Market where he and his partner shipped their catch. His

buyer at the Fulton Market once asked if he ever saw urchins while fishing. Soon he would send a bushel of urchins or so down to New York with his mussels. For Holtz they were usually a gift, he threw in the truck along with his mussels to keep up a good relationship with his buyer. Occasionally the buyer would order a specific amount of urchins for which Holtz was paid. At one point Holtz began selling urchins to an Irish broker who would send them to France. However, this too was a small-scale operation, and mostly a sideline to his work in mussels.

Interestingly, a lot of this small-scale production occurred through the 1970s and early 1980s. This was the time that monetary policy favored exports to Japan, the state and federal governments were encouraging development of industries such as sea urchins, and the West Coast industry was in full swing. At least some Japanese were aware of the potential fishery at this time, also. Downeast Fisheries worked in the herring fishery for generations and established a relationship with a Japanese businessman who imported goods to Japan, including herring roe. This Japanese importer approached them about the green sea urchin back in the 1970s, but at the time the Downeast Fisheries was too busy with other fisheries to start something new. They agreed to let him know when they were ready for the sea urchin fishery. Therefore, despite conditions favorable to an industry and apparent knowledge of the resource, it took several years for the fishery to develop.

The transformation of the Northwest Atlantic sea urchin industry from small-scale and domestic to the global productive system that it is today included the combination of entrepreneurial acts, and the mobilization of labor through social capital. There were two kinds of entrepreneurs that established links with the Japanese - those who initiated the

relationship themselves and those that were approached by the Japanese. In addition, the entrepreneurs came from two different social contexts, those with ties to the inshore commercial fishing industry, often as buyers, and those from outside the industry.

Social Capital Advantages of Traditional Entrepreneurs

One group of entrepreneurs was looking for business opportunities, did not come from commercial fishing backgrounds, and was not necessarily looking into a commercial fishing business let alone sea urchins. These entrepreneurs were similar to Robert Thompson whom I mentioned above. Thompson was looking to start his own business and was in Japan looking for contacts to start exporting Maine products.

> I just had a thing about Japan for some reason. They had all the money at that point in time, and if I was gonna be in the international trade business, I wanted to deal with somebody that I could not have to worry about getting my money... So, I actually went to Japan a couple of times back in 1988 I guess. I tried to sell some traditional Maine products; you know Christmas trees, blueberry jam, jelly, furniture... I didn't have any success in selling anything else over there, but I did find some interest in urchins while I was over there.

A similar case is Nicholas Cummings. Cummings and his son started a commercial SCUBA diving business in the early 1980s after moving to Portland, Maine from California. While running the business and diving in Casco Bay, they could not help noticing the large number of urchins blanketing the ocean bottom.

> So, then in the process of diving all around Casco Bay, I saw billions of urchins on the bottom and I knew that there was a market for some urchins. I had seen it done in California. So, I did a little bit of searching and I found that there was a very, very small market for urchins in the USA, but an awfully small market.

Although busy in the domestic market, Cummings knew there was a larger market in Japan because in California he had seen urchin boats unload by the truckload. In 1985, he decided to take a trip to Japan.

> In Tokyo, I went to the auction. They got a huge auction there. And they have warehouses as wide as a super highway, long, and piled up to the ceiling with urchins. And at the auction, they can all be sold within the matter of an hour or two. And from there, I met urchin processors... It was rather difficult because nobody, especially the Japanese, nobody wanted to be the first one. And they, somebody had to be convinced that the Maine sea urchin was a good marketable urchin. Up until then, nobody knew. And I knocked on a lot of doors until finally I was lucky enough to knock on a right door. And I was super lucky because the door that I knocked on, this gentleman in Japan, is known as the godfather of the urchin industry.

Thompson and Cummings both went to Japan looking for contacts to get into the sea urchin industry. Cummings with the specific intent of working in sea urchins based on his knowledge of the California industry. Irving Johnson offers a slightly different case. He was working as a research assistant at a local biological lab in downeast Maine. As part of his work, he had become curious about the green sea urchin.

> I had a friend in California who called me one time. We were research buddies. I was mentioning that I was working with sea urchins and he says, "The Japanese use them, I'll give you a number in Japan to call." Of course, I didn't speak Japanese. The guy in Japan didn't speak English. But anyway, we done what we could to talk.

The relationship didn't take off right away. Instead they talked off and on for a few months and Johnson sent over a sample of 200 or 300 pounds.

> The guy who got them, says, yeah this is exactly what we want. And could you send me a shipment of 500 kilograms. Whoa! This is a major project, I was thinking at the time. My wife and I, the next week, picked up 500 kilograms... When he got them, he loved them. He said, well send me 5,000 kilograms.

These examples contrast with the group of entrepreneurs that resemble Bruce Avery, whom I discussed at the beginning of the chapter. While members of the first group were actively looking for the opportunities in this global industry, this second group was not. They were uniquely open to the opportunity when presented to them, however. These entrepreneurs were established in the inshore fishing industry, often as

inshore buyers, and often established in the community when Japanese businessmen approached them. Avery was buying lobsters in Smallport, a business started by his grandfather in 1919, when a Japanese businessman approached him about buying and processing sea urchins:

> Well, he showed up here because, I think he was more or less scouting the coast of Maine to see what there was for opportunities... He had done enough research to know what he was looking for, and he'd done enough with his speech therapy, that you could understand him fairly well. And then, when he came, who he was gonna buy for, who he was gonna deal directly through, the airline he was gonna work with, the people in Japan he was gonna deal with, it was all laid out... And where he had an Oriental background, he'd come from Japan and traveled all over, and he knew all the ins and outs about it, he came here and discussed it with us.

The opportunity usually involved some investment, and the risk accompanying that. The Avery family built a building by the wharf for the processing of sea urchins. However, they made these investments with their existing business as an inshore buyer in mind. The Averys had already considered a building such as this to assist with packing of lobsters and other seafood. The existing operations tempered the investments some, making the new opportunity look like a safe risk.

Pete Peters, a lobster buyer on the Portland waterfront, held a similar outlook towards the new industry. Peters had been buying lobsters for about 10 years before being approached about the sea urchin fishery.

> I'm in the lobster business... Lobsters are what we're about, and we have a small boat industry and it's somewhat seasonal. So, when the Japanese came poking around and there was a possibility that it might be a viable industry... The market is strong over there from November to maybe March when the sea urchins spawn out. And that's the time of year when most of our boats are not fishing. So, I had a few boats that were interested in going and we've got location on the pier so it's kind of a natural for us to keep the boats going and at the same time maybe keep the crew busy [and off] unemployment in the winter time... At the time, the sea urchin thing was pretty low risk.

Lobstermen and lobster buyers make up a large majority of the inshore fleet along the coast of Maine. For buyers like Avery and Peters, being established in the lobster fishery tempered some of the risks of the new endeavor, and perhaps more important supplemented the lobster fishery by providing work during the slow winter months.

In some cases, the Japanese approached these entrepreneurs because they had done some work in the small domestic market for sea urchins. A Japanese company working in Oregon approached Peg Buck, owner of Buck's Wharf in the Casco Bay region. The Bucks had been working in the domestic market for many years before the Japanese market opened. They decided to increase their work in the fishery as a result. Two different Japanese companies approached Harvey Holtz about the sea urchin fishery. Holtz had been supplying a small amount of urchins to the Fulton Fish Market as a supplement to his harvesting work in the mussel fishery. With offers from two Japanese buyers Holtz chose one and made sea urchins his primary work.

Although the actual steps differ, these actors hold a similar structural position—an entrepreneurial position—in the productive system. Using Burt's concept, they fill a structural hole between the supply and demand of the industry. Looking from the coast of Maine, these entrepreneurs provide a link through which sea urchins can flow to the distribution networks of the Japanese economy. Looking from the east, the entrepreneurs provide a link to the network of suppliers along the Northwest Atlantic coast. Given this, it is not surprising that the fish buyers established in the inshore fishery were approached about this new opportunity. They in fact held the social resources of value to the Japanese businessmen. They held the social capital associated with their embedded

position in an existing social context along the waterfront. For these entrepreneurs it was not hard to begin buying sea urchins, in fact they considered it somewhat commonplace.

> ...[M]y role was...to secure the supply. And it wasn't very difficult for me, cause I was already down here and I could buy product in Maine with a phone call. Well, there's always divers around and people will learn to dive quick if there's money to be made. So, in the wintertime there's not a lot to do but if there's money to be made. It doesn't take long for the word to get out. These guys were buying dry suits in a week.

For those already embedded in the waterfront context securing a supply of sea urchins from the network of harvesters working on the waterfront was not hard. In fact, Peters had already felt some push from harvesters he was working with who knew other boats were harvesting urchins:

> Everybody's kind of looking. If somebody's doing sea urchin, they come home with a boatload of sea urchins, then [the boats I work with] start asking me, and it's time to look into this.

When already embedded within a social context such as the waterfront it is easy to react to an opportunity that comes along. Although it seems natural and sometimes hard to describe for these entrepreneurs, this stands in contrast to the entrepreneurs that did not come from that context. These other entrepreneurs either struggled to recruit harvesters, or needed to develop ties with another buyer already embedded in the waterfront context.

Cummings, for instance, already had ties with a potential network of sea urchin harvesters. When moving back east from the West Coast he began a commercial diving business with his son. When they got started in the sea urchin fishery the two did some of the harvesting themselves, but needed to recruit more divers. Cummings turned to his social networks in the diving community:

> I have, and have had, for many years the reputation that most, a large percentage of the divers in Maine know me. From my diving experiences and things that I've done in diving over the years. When I approached the

> first divers, they were very difficult to try and convince them that they were gonna be able to make a living at diving for urchins.

Although Cummings had contacts to a population skilled in the technology of SCUBA diving, they did not necessarily look at the opportunity from the same perspective as those already on the waterfront. Cummings had to recruit hard for divers, putting up signs at dive shops, through stories in papers and the radio, and offering his own boats as dive platforms. This brought an unusual assortment of harvesters into commercial fishing that had not worked in this sector before. As demand grew, Cummings would eventually break into the existing inshore fleet through an established inshore buyer.

Thompson and Johnson went immediately to existing buyers in their area to secure a supply of sea urchins for their Japanese customers. Having no experience on the water or on the waterfront, they really had no choice in order to get started. For Thompson it was the first thing he did:

> So, I came back and met another guy who was in the business, Patrick Scullin. We formed a company and he had some family down there. We set up in his brother in law's garage and started packing urchins in there... And he had already, you know, was involved in the business... And he had a relationship with some of the divers, so we were able to get urchins.

Being able to get urchins was the primary role of the entrepreneurs in this position. The best way to do this and do it quickly was either to use already existing relations or establish ties with someone who had a set of relationships that would be able to mobilize labor and supply sea urchins. This was Johnson's approach also. At first, he approached fishermen in the area:

> They thought my wife and I was crazy. They knew that I was a Vietnam veteran, of course, I had longer hair, and nobody else did, so we were different in the beginning. And that's where we hit most of our problems.

Not having any of the social capital necessary to start in the industry, he instead turned to a group already embedded in those relations. There were a number of clam shops around at the time with ties to harvesters and facilities for packing seafood.

> I worked with dealers first because the fishermen refused to fish for urchins, they thought we were crazy. So, we worked with the dealers first... There was enough little clam shops and places like that that you could get in. These are small places, probably 10 or 15 people could fit in one of them.

When Johnson says the fishermen refused to fish for urchins, he really means they refused to fish for him. However, for the dealers with established relations in the inshore fishing industry getting harvesters to fish is not a problem. We have seen that an entrepreneur embedded within the network of relations surrounding the inshore fisheries can mobilize labor through the social resources within their social context. For the entrepreneur without the social resources a part of that context, they must seek them out. In their first steps towards mobilizing labor in the sea urchin industry this is what those entrepreneurs did. They approached an established dealer in the inshore fisheries and began a relationship with them in order to get a supply of sea urchins for their new Japanese contacts. These early strategies of entrepreneurs were the first steps in what later became the three sectors of the sea urchin industry today.

Given the social capital advantages of embeddedness, it is not surprising that those entrepreneurs embedded in the inshore communities and fisheries were approached by the Japanese to take part in the new opportunity presented by the sea urchin fishery. Moreover, it is not surprising that those individuals not embedded in that context turned to this group to take advantage of the new opportunities. These individuals and firms had unique social advantages associated with their embeddedness that enabled them to get the industry started and take advantage of the opportunities. The most obvious advantage

lies in the material infrastructure of the inshore fisheries: the existing wharves, boats, and machinery. However, more subtle, but obvious after the previous discussion, is the social advantages derived from being embedded in a social network of existing ties. Powell (1990a) has described the importance of the hard found trust and complementarity in productive relations that exists in the network forms of organization.

> In network forms of resource allocation, individual units exist not by themselves, but in relation to other units. These relationships take considerable effort to establish and sustain.... As networks evolve, it becomes more economically sensible to exercise voice rather than exit. Benefits and burdens tend to be shared. Expectations are not frozen, but change as circumstances dictate. A mutual orientation - knowledge, which the parties assume each, has about the other and upon which they draw in communication and problem solving - is established. In short, complementarity and accommodation are the cornerstones of successful production networks (Powell,1990a:303).

According to Powell (1990a), the emphasis on relationships in networks creates advantages in production environments. Producing in these environments can and often does require regular innovation and adaptation to changing circumstances. Information is essential to this process, and strong reciprocal ties provide flows of reliable information. Taking a risk on something like the sea urchin requires a strong sense of trust, and mutual obligation that one will not be left out to dry. Newcomers to the inshore fisheries were met with some contempt, even laughed at. However, the same proposition coming from a trusted member of the inshore community holds more credence.

Inertial Pressures

Given the advantages of the traditional inshore buyers we might ask why they did not take advantage of the opportunity earlier. Put another way, why was it the aggressive behavior of outsiders to the waterfront, and not traditional buyers already established on

the coast that got the industry going? Although the network forms of organization typified in the inshore fisheries are able to take advantage of opportunities, there appears to be some keeping inertia in this network from taking advantage of this opportunity. Hannon and Freeman (1984;1989) in particular have attempted to systematically address the inertia of organizational forms. They find the reliability and accountability of a firm the most important qualities assuring its persistence. However, the factors that create reliability and accountability often create inertia in firms.

> Some of the factors that generate structural inertia are internal to [firms]: these include sunk costs in plant, equipment, and personnel, the dynamics of political coalitions, and the tendency for precedents to become normative standards. Others are external. There are legal and other barriers to entry and exit from realms of activity. Exchange relations with other [firms] constitute an investment that is not written off lightly. Finally, attempting radical structural change often threatens legitimacy; the loss of institutional support may be devastating (1989:149).

Those buyers already established in the inshore fisheries were a part of an already existing structure of roles, authority, and communication that produced reliability and accountability in relations with other firms. The already existing relations gave them an advantage in moving into a new fishery, but it created inertial forces, also. These entrepreneurs were not willing to drop those existing relations for the new fishery and its new structure of roles, authority, and communication.

The case of Downeast Fisheries demonstrates this. The firm was aware of the potential sea urchin fishery for years before one ever developed. However, Downeast Fisheries was already committed to the herring industry. This included physical capital investments, as well as commitments to suppliers, employees, and customers. Similarly, Pete Peters describes his move to the sea urchin fishery as a move that fit well with his lobster business, not one that would replace this business. In his own words, "Lobsters

are what we are about." For these entrepreneurs, their existing structure of relations inhibited their movement to the new fishery. However, the new entrepreneurs did not have the existing relations to inhibit their interest in the new fishery. Consequently, they aggressively pursued production in a way that led to growth of the industry as well as growth of firms operating in the industry.

Carroll and Hannon (1995:152) point out that it is new firms designed to take advantage of some new set of opportunities that offer the largest threat to existing firms. When inertial forces keep the existing firms from changing organizing strategies quickly enough, they can be crowded out of the niche conditions. This is in fact what happened in the Northwest Atlantic sea urchin industry. New entrepreneurs, without any encumbrances, were able to develop strategies of competition for supply within the fishery that confronted the traditional inshore organization. Rather than compete, and have to reorganize existing relations, these firms chose exit from the industry. I will pick up this theme again in the third section of this chapter. Below I look more closely at the new entrepreneurs that entered the sea urchin industry, and the development of the business group and transient form of organizing supply networks. The development of these entrepreneurial strategies is linked to the development of the processing sector of the industry.

Integration, Innovation and Imitation

The development of the processing sector included industry expansion, the integration of production, and the development of unique organizational strategies. These decisions took place within a competitive organizational field where entrepreneurs were trying to solve problems of organization while remaining competitive in the new industry. In

some cases, entrepreneurs developed innovative organizational strategies that they believed increased their competitive position in the industry. In many other cases, the entrepreneurs mimicked the strategies used by other entrepreneurs that they believed were successful. They meant to assure their own success with the moves.

Processing and the Business Group Entrepreneurs

For the first few years of the industry, shipments of sea urchin to Japan from the Northwest Atlantic coast were whole/live urchins, what is called a "boxed market" on the waterfront. These urchins were harvested live from the ocean, boxed in cool boxes with ice packs, and sent to Japanese processors in Hokkaido. Shipping a box of live urchins can be difficult. The urchins can live outside of the water for some time, but if the temperature gets too high, the texture of the urchin roe will soften. Also, if the temperature falls below freezing for too long the texture and cclor of the roe is damaged. There were some early mistakes made as urchins were packed incorrectly and arrived in Japan unsatisfactorily. Using the airlines often was a problem. Most urchin shippers have a story of a large and valuable shipment of live urchins that sat at an airport somewhere until they were worthless.

Although there are these practical problems with shipping live urchins, they are not the most common explanation for finding an alternative to the boxed market. The more common explanation processors use to explain their decision to process relies on cost-benefit reasoning. They usually portray it in the common sense manner Nicholas Cummings uses here:

> Well, if you stop and think about it. If you take an average 10% ratio. What that % means is that if you weigh up 10 pounds of live urchins and you get 1 pound of roe out of those urchins, that's a 10% ratio. So, that

> means if you got 1,000 pounds of urchins, that you are paying $2.50 a pound to ship over, and instead of that you got 100 pounds of roe. The difference in the airfreight is huge.

The roe of the sea urchin is the delicacy in Japan; the rest of the urchin is discarded in processing. If you can eliminate 90% of your airfreight costs that is an economic advantage.

However, a closer look shows that the advantage of processing is not quite this clear. Very often, an exporter can negotiate deals when making regular large airfreight shipments like live urchins. These deals can defray some of the cost advantages of the smaller processed shipment. More important, the decision to process is a decision to integrate activities previously carried out by other firms in the productive system. This includes taking on substantial costs in equipment, facilities, and labor, which substantially cut into the savings associated with airfreight. Perhaps most importantly, the decision to process was a decision to enter a different market. Uni processed in Japan is a high priced product supplying an elite customer. Uni processed outside of Japan produces a low priced product for a more modest consumer. Processing outside of Japan does not add value.

If not the cost saving measure so often referred to, what factors did lead to the move to processing urchins on the Northwest Atlantic coast? The change resulted from the move to expand production by firms started by new entrepreneurs. They saw expansion as a necessary step in order to survive in the industry. Operating without the restrictions of working in other fisheries, and without normative or experiential guides to organizing their business, the new entrepreneurs innovated and imitated each other as they developed larger, more integrated firms.

The opportunities for expansion existed early in the industry, before processing developed, driven by the Japanese demand for the green sea urchin. For Irving Johnson the immediate demand was a surprise. His first shipment was 200 to 300 pounds:

> And of course, that was like 2 or 3 million pounds to me. I mean, I was taking this 2 or 300 lbs. and shipping it to a different country... The guy who got them, says, yeah, this is exactly what we want. And could you send me a shipment of 500 kilograms. Whoa! This is a major project, I was thinking at the time... And then he received them, loved them. He said, well send me 5,000 kilograms... This is too much! Could we send you what we got?

Nicholas Cummings found the same unquenchable demand when he first began. In his first year his son and he alone dived for the urchins:

> It was along towards the end of the Maine urchin season, but that year, just my son and I alone, did a quarter of a million dollars worth of business... The following year, I hired more divers, more boats, and we did 2 million dollars worth of business. Next year we did 5 million dollars worth of business.

A strong demand and favorable exchange rates helped support this expansion. The price of Uni remained high in Japan, and a strong Yen made trade conditions very favorable. Cummings started his business in the Portland region of Maine around Casco Bay. Trying to fill demand, and given the large supply along the coast, Cummings began buying urchins east of Portland:

> By the middle half of the second year, we needed to expand into other areas. So, I went up to Friendship and I had a meeting with a lobster business, in other words a lobster dealer, and he had lobstermen come in and sell him lobsters. So, I asked him to call a meeting with the lobstermen and I went up there and gave a talk.

Cummings' expansion out of his region also followed an expansion on his demand side. The boxed market for Northwest Atlantic sea urchins is a limited market. Here urchins are processed for an elite market that is limited in its growth. Cummings' desire to expand on the supply side led him to establish ties with trading companies who were able

to reach a lower end market for sea urchin Uni in Japan. Although the value of the urchin Uni is lower, the demand for this product was on the increase, as we saw in chapter one. The trading companies gave an immediate outlet for the vast supply of sea urchins along the Northwest Atlantic coast. It was also the trading companies that gave a lot of the impetus for processing on the Northwest Atlantic coast, which some respondents relay in their description of the decision:

> The first year, I wasn't gonna over commit myself to this... So we brought a few, I can't even remember how many, but a few is probably a lot to you... And ah, and then we were shipping them over in the shell. Then they wanted us to process a few here. So, we tried processing them on a small scale.
>
> Shipping the whole urchin. We did that for 1 or 2 months. This was in the summertime that we did this. And we was having a little bit of trouble with the quality because the airlines didn't know how to treat them, so they were becoming a little bad. They were still good, but they were becoming a little bad. And then he wanted us to process.

It appears the larger trading companies made the decision to process rather than the small firms in Maine. The development of the processing plants came under the supervision of the trading companies also. The Northwest Atlantic firms had the advantage of teams of experts as they developed their processing facilities. These experts refined the processing techniques for the green urchin so that the finished product would satisfy the new market. The firms also found financial support as they made the decision to integrate. In some cases, the Japanese provided some money to purchase initial supplies, and they assured a steady demand in order to cover investments in plant facilities.

The introduction of processing opened a new and larger market for Northwest Atlantic sea urchins. Uni processed in Japan sells in expensive restaurants, especially during the holidays. The Uni processed on the Northwest Atlantic coast would go

directly to supermarket chains, rather than to processors. This created an expansion similar to those when the boxed market originated.

> Then they wanted us to process a few here. So, we tried processing them on a small scale... The next year, we made a bigger commitment. I rented another building locally here, and we set up a processing shop. Give you an idea of the magnitude, I had 67 Cambodians working for me at one time... and I shipped over 2 million pounds of urchins that year, into Japan.

The expansion did not stop at this level; large processors were buying as much as 11 million pounds of sea urchins in 1993.

As much as the trading companies that invested in the industry guided the decisions to expand and aided that expansion, the willingness of entrepreneurs is equally important. The new entrepreneurs were looking for the expansion opportunities. They believed reaching the larger market was the way to survive, and moving into processing was the way to reach that market. The experience of International Collaborations demonstrates this process. Robert Thompson and Patrick Scullin started the firm shipping live urchins in the boxed market. They did this for a few years before other firms started to process on the Northwest Atlantic coast.

> Then the business started to change and people started processing over here and everybody felt like that was the future. You know we had to process over here, because we were paying $1.50 a pound for airfreight to get the live urchin over to Japan. And we just cut them open here and save all that money. Compete with the Japanese processors, and that's what everybody started doing.

Confronted with the changes in the industry, International Collaborations was forced to consider their future when the trading company approached them about starting a processing plant.

> There was some interest on Patrick's part with processing because he felt like that was the logical progression for us that we needed to do that to

> survive. I didn't really agree with that. I just didn't like the idea of having a huge overhead of processors.

International Collaborators had the opportunity to move into processing. They would have a market for the product, and were offered financing to invest in a plant. Thompson and Scullin decided to take separate paths. Thompson bought Scullin's share of International Collaborations and continued shipping live urchins in the boxed market. Scullin accepted the offer presented to International Collaborations and invested in a processing plant, moving into the new market. The division that existed between these partners highlights the importance of the decisions made to move in this new direction. Each firm, presented with the opportunity to make the move into the new market and the decision to integrate the processing, had to decide if the move made sense. Under these circumstances, operating in a new and uncertain economic environment, these firms relied on mimetic processes in order to develop business strategies. In ambiguous situations, firms may model themselves on other firms deemed legitimate or successful. In the words of Scullin, the move to processing was what he thought they needed to do to survive.

The move to processing led to new means for mobilizing supply networks. The new entrepreneurs had already turned to buyers embedded in local inshore production to obtain their first supply of urchins to ship to Japan. With the move toward expansion, entrepreneurs followed this strategy moving into other regions, establishing relations with embedded inshore buyers, and increasing their supply networks. Each of these buying stations is a legally recognized business independent of the large buyer, but sells their product exclusively to the processor. In the region the buying station operates, industry participants know what business group the buyer works within. The region of a buying

station is carefully chosen in order to assure separate buying stations within the same group can operate without overlap, and in order to assure competition in a region where another business group operates. As these large processors began expanding with buying stations they followed each other into the new regions setting up stations to compete with each other, and with smaller entrepreneurs exporting to Japan.

Transient Entrepreneurs

A third type of entrepreneur entered the Northwest Atlantic sea urchin industry after the business group entrepreneurs had begun processing. This group came predominantly, though not exclusively, from the Cambodian and Vietnamese refugee communities in New England. When the first sea urchin processing plants opened, entrepreneurs recruited labor by formal means: employment agencies and classified ads in newspapers. A surprise to the processors, the majority of the response came from the refugee community. One processor, who gained some acceptance in the refugee community, is candid about his surprise:

> I didn't realize there was that many around. But they came from all over New England to do this... word of mouth, and they're really a tight-knit community, all through New England... the whole families would show up. They'd bring their kids, their kids would come after school, and I had whole generations of people working with me.

This particular processor expresses his surprise, but social scientists have documented this type of informal network among immigrants (Portes, 1995; Portes and Manning, 1986). His seems like a fair assessment of the situation. Prejudice along with language and cultural barriers, has created a tight knit community among refugees, and when work appears the word spreads quickly among these dense social networks. Ta Kutchai was in Lowell, Massachusetts when his cousin called him from Portland, Maine and told him

about the new work opportunity. There was a processing plant hiring, paying fair money, and no language or cultural barriers to employment existed. Kutchai brought his brother with him to Maine and they began working in a processing plant in Portland.

As the processing sector in Portland grew, so did the refugee community involvement. It is a tightly knit community, living in the same area of the city, playing in sport leagues together, and participating in community celebrations. Working in the processing plants is a part of that closeness as well, giving them an advantage in mobilizing processing labor. This was demonstrated to Mati Oshono when he needed to mobilize processing labor to start a sea urchin processing plant. Oshono had been buying sea urchins for a few years until, because of some unique business circumstances, he needed to begin processing and make shipments in a very short time. Under other circumstances, this would mean finding a trained management staff, a processing labor force, and a period of training for the new staff. In this case, Oshono approached a member of the Cambodian refugee community with some experience in the sea urchin industry. This individual was able to organize a trained processing labor force, and within two weeks International Exporters was making shipments to Japan.

The ability to mobilize the processing labor within the refugee community is similar to the ability of inshore buyers able to mobilize harvesting labor. In this case it was the shared membership in a cultural community, or an ethnic enclave (see Leiberson, 1980, Portes and Manning, 1986) that provide social resources valuable to the enterprise.

It was not long before members of the community began using this advantage to start their own processing plants. Similar to other ethnic groups living on the margins of a host country, the Cambodians had a desire to shed their reliance on others to survive.

They started their own businesses as a way to help the community withstand the difficulties of living in a foreign country.

> At least we can try to do it; at least we are working for ourselves. It is hard for us to find a job in a company, because most of us don't really speak English, or write English. This helps us get a start, get our part.

When the sea urchin processing plants first opened they offered an opportunity to an ethnic group with disadvantages in the human capital skills, particularly education and language skills, valued in the larger society. Now, using social capital resources, Cambodian entrepreneurs attempted to establish their own place in the new industry. One of those entrepreneurs was Ta Kutchai.

Kutchai had moved to Portland to start working in the sea urchin processing plants, but he soon grew disenchanted with the new work. He left within a few months of arriving, and began pursuing his interest in opening his own processing firm. He looked for Japanese businessmen interested in working with him, and after some time he met a Japanese man who had previously worked in the Northwest Atlantic sea urchin industry as a representative of a trading company. This Japanese businessman left the trading company to start his own business brokering sea urchins for US processors. As the environmental conditions supporting the export of urchins became very favorable, Japanese brokers emerged. The brokers do not have the technical and financial resources of the trading companies, but they provided a door to Japan for the interested processor by handling shipment and distribution.

With the tie to Japan and the ability to mobilize labor for processing, Kutchai still needed to secure a supply of sea urchins. He could not mobilize existing ties for harvesting, like the embedded inshore buyers, and he did not have the financial capacity to set up buying stations along the coast. Instead, Kutchai rented a Ryder truck and drove

to small ports where established sea urchin exporters were buying urchins from harvesters. The first trips to the coast were not very successful. Eventually, Kutchai found that offering high prices and paying in cash increased his success at securing a supply of urchins. This strategy keeps the business operating close to its margin, but in Tit's words, "Without sea urchins there is no business." The relative success of the first transient processors led to imitators. These firms visit areas where they have no strong social ties and attempt to buy urchins through competition with the established buyers in the area. Sometimes they park on the side of a central road with a sign announcing "Urchins Wanted." At other times they will drive right down to the pier where harvesters are landing their catch from the day.

The competitive style of the transients for securing supply keeps them operating at their margin and many times these firms drop out of the industry. This leads to the high turnover found in **Table I.1**. Most processors in the 1994-95 season had dropped out by the 1996-97 season. At the beginning of the 1997-98 season, seven new processors had opened in the Portland area - all Cambodian owned. For some, they do not expect to make it past this season. This is the case for Hun Sammaki who began a processing firm for the 1997-98 season. He had seen his uncles' processing plant, in which he worked as a child, go bankrupt, and he knows first hand the amount of competition in the processing sector. Many of the other small processors are his friends, people he plays ball with or spends time with on the weekend. Sammaki is hopeful, but not confident he will be in the business next season. After next season, he does not expect to work in the industry at all.

The entrepreneurial process for this third group has some similarities with those of the inshore buyers and the business group entrepreneurs. Similar to the inshore buyers, the transients in the refugee community began with a social capital advantages that allowed them to mobilize processing labor easily. However, they did not carry with them the commitments and normative pressures found with the embedded inshore buyers. Instead, like the business group entrepreneurs, they were able to innovate and imitate strategies for securing a supply of sea urchins for their Japanese customers. As the new entrepreneurs entered the inshore fishery density and competition increased.

Competition and Inertia

Organizational ecology uses the fundamental and realized niche to conceptualize the competition that can occur between different organizational forms (Hannon and Freeman, 1989:97-116). A fundamental niche includes the necessary environmental conditions to sustain a set of firms that employ a certain organizational strategy. However, when different sets of firms, employing different organizational strategies, rely on the same environmental resources their fundamental niches overlap. Overlapping niches restrict the space within the niche that can sustain the set of firms. The realized niche refers to that restricted space, reached through the combination of environmental conditions and competition between the different sets of firms for the environmental resource conditions.

This framework provides a way to put boundaries around the competitive process. Although the processed and whole sea urchins reach separate markets and the large and small processors supply a different type of Japanese customer, the firms operating within each rely on the same fishery resource to supply those markets. The firms compete within the same niche for supply if not for demand. However, the ecological conception

does not provide insight to the process by which competition takes place. Here the institutional approach can help. We have seen above how institutional factors have led to the variety of organizing strategies found in the Northwest Atlantic sea urchin industry. However, these organizational strategies include competitive strategies that come into conflict. This is particularly true with the traditional inshore buyers. These inshore buyers bring with them normative pressures, or conceptions of control, from their existing relations in the inshore commercial fisheries. When the innovations followed by the business group and transient entrepreneurs come into conflict with these conceptions these entrepreneurs have tended to drop out of the sea urchin industry.

The traditional inshore buyers follow an organizational strategy that includes switching among fisheries based on season, long-term reciprocal relations with harvesters, and an association with a particular port or region of the coast. When these buyers entered the sea urchin industry, they brought with them this set of institutionalized organizational strategies. For these entrepreneurs the strategies were commonplace, just the way you do business. However, the new entrepreneurs, coming from social contexts outside of the inshore fisheries, did not carry these institutional strategies for doing business. Instead, they developed strategies that conflicted with those of the inshore buyers.

The first conflict came with the traditional strategy of switching between fisheries. For the inshore buyers the sea urchin fishery was a supplement to their already existing work. Particularly in the case of the lobster buyer, sea urchin production picks up during the slow winter months. However, sea urchins can be harvested in the spring and fall, and the new entrepreneurs did not see the sea urchin fishery as a seasonal

supplement. Instead, these entrepreneurs organized the fishery without the seasonal strategy beginning production in late summer and carrying it on until late spring. To Pete Peters, an early inshore buyer, this conflict was apparent right away.

> He was buying and I don't think in large volumes, but he was not in any other business at the time, so he had the time and energy to go after this, where other people were already in business, already in business doing something else.

This difference in commitment sustained the different organizing strategies of the inshore and new entrepreneurs. For Bruce Avery this conflict lead to quick ending of a relationship with his Japanese customer. Avery Lobster worked in the sea urchin fishery when the lobster season was closed. After two years, the Japanese customer ended the relationship, preferring a tie with an entrepreneur willing to work the longer season.

The strategies of expansion by the business group entrepreneurs and the transience of the small processors also challenged the regional segregation of the inshore buyers. The regional segregation was a form of cooperation among inshore entrepreneurs. Rather than compete directly with each other, they would stick to their particular area and sometimes cooperate. If an inshore buyer ended up with more product than his market could handle on a particular day he could pass it on to another inshore buyer. For Downeast Fisheries, it was common to share trucking duties.

> Joe's trucked for me and I've trucked for him a lot. Bill Carry has trucked for us. Phil McGuire, I've trucked for him a lot... It's those relationships that really made the thing work... Everybody here has always worked together... Families go back generations, literally 4 or 5 generations. So you don't screw somebody that you know your kids are gonna be working with in 4 or 5 generations, or your grandkids. You try to do a good job.

This kind of cooperation helped business on a day to day basis, but it also helped reduce direct competition in the region a buyer operated. When the new entrepreneurs began moving into these areas and trying to buy sea urchins, they came into direct conflict with

these institutional arrangements. In order to move in to the new areas, the entrepreneurs attempted to take harvesters away from their exiting relations with buyers by undercutting their prices. This directly challenged a third institutional arrangement of the inshore buyers, the long-term reciprocal ties with harvesters.

The inshore buyers work with harvesters on a long-term basis, in a relationship that presumably has mutual benefits. The buyer secures a steady supply of urchins and the harvester receives a fair price for his catch. Inshore buyers began working under this assumption in the sea urchin fishery, but as the new entrepreneurs moved into their areas, they attempted to draw harvesters away by undercutting prices. Their success was frustrating to the inshore buyers; to Peters it was perplexing:

> The lobstermen would have the commitment. It's understood; it's part of the culture. The [urchin] divers wouldn't... So, if this guys paying 2 cents more a pound, their mentality is why wouldn't I sell to him. My mentality is why would you sell to him? I've been buying from you all along.

With the introduction of price competition, the inshore buyers began to loose harvesters to new entrepreneurs trying to get a stake in the area. When new entrepreneurs undercut their prices, it challenged the inshore buyers' legitimacy, their fairness in dealing with harvesters, leaving them to defend their practices:

> I tried to be like I say, as fair for the buyer, the dealer, and the guy doing.... With me, I took what I had to get out of it to make mine; my buyer had to make a living to be able to buy tomorrow. The diver had to make a living... Me, I do the best I can and I say, this is what I've got to have to operate. I don't need no more. I make as much as I have to make without having to make a killing. All I want is just a little piece of the pie. And then I can see, knowing, watching throughout the years, it takes this much to make a living.

Put in the position of competing with the new entrepreneurs would mean leaving behind strong beliefs about how they should run an inshore buying business. The new competition would require adjusting work in other fisheries in order to extend their

season in the sea urchin fishery, dealing with competition in their region that disrupted long-term ties with harvesters, and dealing with the ideological challenges to their traditional practices. In most cases, traditional inshore buyers found dropping out of the industry a preferable option, often with no regrets.

> So, I did not feel comfortable with that part. It turns it into what, in my opinion, what we call a whore industry, and I'm glad to be out of it... There isn't much structure to it and no loyalty, and it's whoever's got the best yield that day. That's not necessarily bad, but that's a reason why I wouldn't want to be involved in it again.

With the new competition from entrepreneurs outside the inshore fisheries the new fishery had developed practices that existing buyers found distasteful. The first pressures came from the business group entrepreneurs moving into new regions. However, for many it was the movement of the transient entrepreneurs into the industry lead to their exit. These entrepreneurs were working with slightly less overhead costs than the large processors, allowing them to beat existing prices. In many cases, these transient firms were willing to reduce profits, even take a loss, in order to establish themselves in the industry. This led to a price competition the inshore buyers either could not or did not want to participate in. This change lead Downeast Fisheries to drop from the industry:

> I just stepped away from the business, told everybody that's it. Called Sato and said I'm done. Best move I ever made... I watched a guy go over one day and get paid $2.00... The same day I was out there trying to buy urchins for a buck a pound. And I said this is fucking nuts. Unless you want to play this game for a few years to beat these guys at their own game, you can't do it. So, I got out. The best decision I ever made. Everybody in the business says, God, you made such a good decision.

When these inshore buyers drop out of the sea urchin industry, they do not fail as businesses. To the contrary, they remain thriving inshore buyers operating under the same or similar circumstances as they were before the new fishery came along. For these buyers the decision to move into the new fishery was a diversification move; one that

seemed reasonable, at its beginning. However, social process that they could not have predicted lead them to drop from the industry, leaving a new fishery dominated by new entrepreneurs.

Table 2.2 Comparison of three entrepreneurial types.

Traditional Entrepreneurs	Business Group Entrepreneurs	Transient Entrepreneurs
Established on Waterfront.	Outside of Waterfront.	Outside of Waterfront
Approached by Japanese.	Approached Japanese.	Both approached by and approached Japanese
Recruit harvesters locally.	Recruit harvesters in many areas.	Recruit harvesters in many areas
Local waterfront orientation.	Expansion orientation.	Survival orientation
Established in other fisheries. Dropped from industry.	Worked primarily in industry. Become established and expand.	Work primarily in industry. Attempt to become established. Regular turnover occurs.

Origins and Outcomes

It is possible to imagine a different outcome for the entrepreneurial processes of the sea urchin industry, one in which established inshore buyers maintained relations with Japanese customers and operated the industry in accord with traditional inshore fishery institutions. In fact, we might even expect this type of industry to develop given the social capital advantages of the inshore buyers for initiating the new industry. The organizational strategies of inshore fisheries have shown adaptable to changes in supply and demand, and they resemble the small-firm networks known for their flexibility to

move quickly into new opportunities. With the move of traditional inshore entrepreneurs into the new fishery, institutional theory would expect them to carry the existing organizational strategies into the new fishery with an isomorphic affect.

An industry quite different than this developed, however. The institutional processes of innovation, imitation, and competition within the industry created a dynamic that began with a reliance on the inshore buyers, but later pushed those same buyers out of the industry. In particular it was the introduction of two new sets of entrepreneurs, without previous experience in the inshore fisheries of New England, that lead to the new organizational strategies that dominated this new fishery. These entrepreneurs operated without the institutional constraints of the inshore buyers. Without the normative understandings of how to operate as an inshore buyer, they developed new organizational strategies and imitated each other in an effort to survive in the new industry. The strategies of survival included strategies of competition that contradicted traditional organizational practices within the inshore fisheries, and eventually lead to inshore buyers dropping out of the industry.

Perhaps this second outcome should not be so surprising, however. The environmental conditions that might have supported a sea urchin industry in the Northwest Atlantic existed long before an industry developed. However, the inshore buyers most favorably situated to take advantage of the new industry chose not to. An unusual species for a market across the globe did not look as inviting a risk to a group embedded in established and successful fisheries. It was not until a group of entrepreneurs looking for new opportunities initiated production that the industry took

off. These entrepreneurs could not have gotten started without the inshore buyers in many cases, but the industry might not have started without the outsiders.

CHAPTER 3

LABOR PROCESSES

"LIKE A FIELD ON FIRE." SO WENT THE SEA URCHIN INDUSTRY ACCORDING TO ONE participant. Over the course of the industry's history, more than one observer has described its development in a similar fashion: a gold rush, a boom[24].

> When the draggers, and then the divers that started getting into it, it was like a field fire. You light a match, and then the smaller it starts... Everybody who had any kind of fondness to the water, some that didn't even, wasn't fond of the water, couldn't even swim. It was, like I say, like a field on fire around here for a while.

Before 1985, a small number of fishermen harvested an almost unnoticed amount of sea urchins destined for an urban immigrant market. In 1993 harvesters landed over 40 million pounds of sea urchin worth over $30 million. Growing along with the landings was the number of people working in this fishery. Where not one person made a living in the sea urchin industry, six years later the industry supported thousands in the harvesting, buying and processing sectors. Most growth took place within the harvesting sector. By 1994, there were over 1700 licensed harvesters, coming from many different walks of life.

As we have seen, economic conditions favored the establishment and growth of new fisheries such as the sea urchin. International monetary conditions favored the growth of a sea urchin industry in the Northwest Atlantic with a product destined for Japan. In particular, the demand for this product in the late 1980s and early 1990s

[24] See Amory (1996) for examples of this characterization.

increased as quickly as supply could be garnered. In 1985, the Yen-Dollar ratio began a period of decline ending in 1995 (see **Figure I.1** and **Table I.2**). As the value of the Dollar decreased versus the Yen, entrepreneurs could purchase more US products at no extra costs. At this time, the Japanese consumers' desire for Uni had not reached a saturation level, and the desire for Northwest Atlantic sea urchins was limited only by the amount of product brought to the Japanese market.

The existence of Japanese demand alone did not provide the economic conditions necessary for the harvesting boom. Entrepreneurial links were needed for the industry to flourish. Chapter 2 shows how entrepreneurial activity in the Northwest Atlantic sea urchin industry began with a few entrepreneurs supplying a small live urchin market. The industry soon began to expand with the introduction of Japanese Trading Companies, Northwest Atlantic processing, and the business group strategy of organizing the coast. Entrepreneurs were positioned to buy as many sea urchins as could be harvested. The density of entrepreneurs increased as the favorable international conditions supported a number of small immigrant entrepreneurs who began buying sea urchins employing the transient organizational strategy.

The economic conditions were ripe for the industry to grow, but the entrepreneurial desire to buy sea urchins could not guarantee the mobilization of labor. The final piece of the industry growth was the harvesting boom that took place. This chapter examines the boom like growth of the labor market in the sea urchin industry, particularly in the harvesting sector. The analysis has two parts. First, I examine a unique set of institutional arrangements a part of inshore fisheries that I have termed *the working waterfront*. The working waterfront includes a set of flexible productive

strategies that include both technological flexibility and social flexibility among a large set of small firms. Similar to other industrial districts, these small firms have developed strategies of cooperation and competition that allow flexible adaptation to uncertain supply and demand conditions. The working waterfront differs from these other regions in its reliance on a State managed common property resource, the ocean. The ocean's resources, and access to them, form an important part of the flexibility of the region. The arrangements on the working waterfront allowed easy access to individuals interested in participating in this new industry, and they facilitated the speed of growth in the harvesting sector.

The second part of my analysis of the labor process examines the strategies of the individuals that chose to take advantage of the opportunities opened by the new fishery. Given the advantages provided by the working waterfront for harvesters to move into the new industry, who did and did not decide to take advantage of these opportunities? Here I introduce three types of harvesters who approached the industry with different career strategies based on their social context. For established harvesters working in other fisheries the new industry was a supplement to their primary fishery. Young harvesters, from the waterfront context but not yet established in a fishery, considered the sea urchin their primary fishery. A third group of harvesters came from outside the waterfront context and approached the new fishery without the career strategies present on the working waterfront. Each type of harvester was able to take advantage of the resources provided by the working waterfront. However, similar to the traditional entrepreneurs in Chapter 2, inertial pressures on established harvesters limited the extent to which these harvesters took advantage of the new industry.

The Working Waterfront

Work, or labor, is any human effort that adds use value to goods and services (Granovetter and Tilly, 1988:177). Labor markets develop when an entrepreneur intends to purvey a certain good and chooses to have someone else provide the labor needed to produce the good. The capitalist labor market is most commonly discussed in economic literature. Here employers and employees are at the center of the market, and employers hire employees for stipulated time periods during which employees concede control of their labor (Granovetter, 1981; Tilly and Tilly, 1994). Hiring includes a long term contract and close supervision of employee labor. Craft labor markets work somewhat differently, relying on subcontracting rather than the hiring of labor (Jackson, 1984). In craft labor markets entrepreneurs have outside shops or individuals perform labor at a stipulated price for quality, and the control and supervision of labor is conceded to the outside shop (Tilly and Tilly, 1994). Organizing work through craft labor markets peaked in the late 19th century, but as Sabel and his colleagues have found, craft forms of production have persisted into the late 20th century along side of the mass production form of organization[25].

When explaining the distribution of labor into particular occupations and jobs neo-classical economics emphasizes the characteristics of the individuals making these moves, particularly the human capital characteristics of the individuals (Becker, 1976). This explanation assumes a situation of open competitive hiring in which employers attempt to hire labor at the lowest possible cost and employees attempt to obtain the

[25] See Chandler (1992) for a discussion of the craft labor markets in the 19th century. See Sabel and Piore (1984) and Sabel and Zeitlin (1985) for a discussion of the organizational forms persistence into the late 20th century.

highest paying occupation or job they can given their human capital characteristics. This approach offers little in terms of explaining the fast growth or the diversity of participants in productive systems. Along with the organizational ecology approach, economic explanations find increased labor activity driven by favorable environmental conditions. However, these approaches do not account for the obstacles to growth that might discourage participants even under favorable environmental conditions. Social factors highlighted in the sociology of labor markets help to understand the process by which labor and entrepreneurs form productive relationships. Economic sociology encourages examination of the structure of opportunities, and patterns of cooperation and information-sharing when studying labor markets.

Along the working waterfront, there exists a unique set of institutional arrangements that govern productive processes of the inshore commercial fishing industry. The labor processes are similar to that of craft labor markets. However, the working waterfront is unique in that it includes the state management of a common property resource, strong communal ties among fishermen, and flexible production strategies that allow adaptation to uncertain market and occupational conditions. Industrial regions dominated by a craft form of organizing production are commonly known as industrial districts. Marshall (1919) first used the term industrial districts to describe the Sheffield and Lancashire regions in the 19th century. Today, well-known examples include the Emilia-Romagna region of Italy (Brusco, 1982; Piore and Sabel, 1984), and the region of southwest Germany (Sabel and Zeitlin, 1985). Networks of loosely linked firms specializing in certain products dominate the regions (Brusco, 1982; Piore and Sabel, 1984; Sabel and Zeitlin, 1985). Production within the districts takes

place among a large set of independent producers that both cooperate and compete with other firms within the region. The balance of cooperation and competition allows production in the region to adapt easily to the persistent changes in specialty markets (Piore and Sabel, 1984:258-77).

The fishing communities along the Northwest Atlantic coast hold many similarities in the organization of production to those found in other industrial districts. However, before I examine those similarities I first look at the characteristic of the working waterfront that most distinguishes it from other industrial districts. That is its reliance on a state managed common property resource, the ocean. As we will see, this characteristic has important implications for the labor process and understanding the quick development of the harvesting labor market in the sea urchin industry.

Formal and Informal Limitations on Open Access

The structure of social relations within a productive system can be either open or closed (Sorrenson and Kalleberg, 1981). Productive relations are *open* to outsiders to the extent that participation is not denied, and *closed* to outsiders when participation is excluded, limited or subject to conditions (Weber, 1968:43). Drawing on Weber, the institutional approach to labor processes emphasizes two mechanisms that work to keep productive systems closed: access to property (Parkin, 1979) and the filtering of personnel (DiMaggio and Powell, 1983). The importance of property is clear; control over property includes control of the material resources essential to the productive process. Filtering of personnel is an attempt by members of an occupation to "control the production of the producers (Larson, 1977:49)." This is done through admitting only those with certain characteristics (i.e. professional training, required credentials,

membership in trade associations) to participate, assuring certain similarities among participants. Open and closed productive systems are particularly relevant to research on fisheries.

In his now classic discussion of common property, Hardin (1968) assumed that the absence of private property and open access were synonymous. He concluded that under common property/open access circumstances a productive system would inevitably head toward overexploitation of the resource, to the detriment of all producers. Ironically, the rational actions of individual producers lead to this tragedy. Although remarkably influential, Hardin's "tragedy of the commons" thesis has been challenged based on the empirical research of fisheries social scientists (see McCay and Acheson, 1987; McGoodwin, 1990). Examining fisheries from an institutional perspective, these social scientists have found that the absence of private property and open access are not synonymous (Acheson, 1987; McGoodwin, 1990:89-96). Instead, the openness of a public resource is variable from case to case, and more often than not "common property" is not open. Instead, some participants are excluded or limited from production. These limits take formal and informal means.

The most significant formal limitation on access to fisheries resources comes from the state. The ocean is a common property secured by positive government provisions. Fisheries resources are public resources and their management is conducted through state administration. The state—that set of administrative and policing organizations headed by a centralized authority (Skocpol, 1979)—dictates the terms of access and use of this public resource. The state is typically the most powerful organization within an organizational field, particularly in fishing industries where it has

ultimate rights over the resources essential to production. Understanding the state's power, Hardin (1968) called for increased state regulation of common property resources in order to avert tragedy. Other social scientists have documented the state role in limiting access to public resources, or in some cases not limiting access sufficiently (Dewar, 1983; Anderson, 1987; Pinkerton, 1987; McGoodwin, 1990; Finlayson, 1992)

State regulation is the most important formal restraint on access to ocean resources, but in the absence of state regulation, common property resources are not necessarily open. In what Dyer and McGoodwin (1994) call the most significant development of fisheries social science over the past decade, a number of researchers have uncovered informal limitations on access to common property resources. These restraints are informal in the sense that they are not sanctioned by the state (see Portes, 1994). However, fishermen often assert rights to fishing grounds and implement strategies to limit fishing effort (see Acheson, 1981). These informal restraints on access typically occur among inshore fisheries (Dyer and McGoodwin, 1994). They take three forms: the assertion of property rights over prime fishing spaces, the exclusion of outsiders from fishing areas that communities assert as their own and the manipulation of information in order to temporarily claim ownership to certain fish stocks (McCay, 1981:5-6). Much like professional and craft associations, informal communal relations can filter labor in inshore fisheries through the assertion of rights to fishing grounds.

While Hardin's conception of the tragedy of production surrounding an open access resource is compelling, the assumption that all common resources are open does not appear tenable. Instead, even in the absence of private property, resources are embedded within the social constraints of the state and informal means of control on

production. Rather than assume a public resource includes open access, we have to approach each fishery asking if or how open is access. As new participants moved into the Northwest Atlantic sea urchin fishery, they met few limitations. Access to the new fishery was very open, perhaps surprisingly so. In the next section, I examine the development of open access to this new fishery, asking why access was not limited.

The Social Construction of Open Access

When the first entrepreneurs began to consider shipping sea urchins to Japan, and when they approached the first harvesters to invest time in the industry, two potential limitations might have stalled the development of the new industry. First, the state, which held ultimate rights over the ocean resources, might have limited participation. In addition, existing fishermen may have attempted to limit access to outsiders through informal means of control. In fact, the state put few limitations on participation, and local fishermen often encouraged the entrance of outsiders to this new fishery. Below I look more closely at the role of these formal and informal institutions in creating open access to the Northwest Atlantic sea urchin fishery.

State Limitations

Rights to the world's oceans have long been a source of international dispute, culminating in the United Nations Law of the Sea in 1982 which gave coastal nations ultimate rights within 200 miles of their coasts[26] (see McGoodwin, 1990:97-106). The US first made claim to this area in 1976 with the passage of the Fisheries Conservation and Management Act[27]. The act secured rights within 200 miles of all coasts for the

[26] This is commonly known as the 200-mile limit.
[27] Later renamed the Magnuson-Stevenson Act.

federal government. More important to the sea urchin industry, it made individual coastal states responsible for the management of the area within three miles of their coasts (the 3-mile limit). This was particularly important to the new fishery because the ecological habitat of the growing sea urchin resource kept it close to the shore, making its management the responsibility of the coastal states.

The first seven years of the industry took place primarily along the coasts of Maine where the state legislature holds the ultimate rights over resources within the three-mile limit. Important decisions on the management of this resource follow the channels of all law making in the state. The Department of Marine Resources (DMR from here on) is the administrative body that controls the resource on a day-to-day basis through the edict of the State. Though ultimate control of the resource lies in the legislature, DMR holds considerable control over the resource enforced by the state's edict. DMR controls access and use of the resources in two ways: 1) through limiting access to those fishermen holding licenses, 2) by establishing rules that affect when fishing is allowed, what techniques can be used, and what types of fish can be harvested. Often the DMR enacts control on particular species of fish, with different amounts of access and rules for each fishery.

The DMR could have limited entry to the sea urchin fishery when the first sea urchins began selling in Japan. Limited entry fisheries existed in other fisheries around the country and the world at the time[28]. However, before 1993 DMR did not pay particular attention to the sea urchin fishery. Anyone could harvest sea urchins by obtaining a $35 commercial fishing license. Two factors contributed to the DMR

[28] For an interesting case see the Oregon Fisheries Development Council where access to new fisheries is limited immediately (Richard Ford, personal communication).

decision not to limit access to this new fishery. The first stems from the department's history of managing its coastal resources. No precedent in the DMR management strategies limited access to fishery resources. While they have limited how fishermen fish, they have not limited access to a fishery.

There is little reason to believe DMR would change their approach to the new sea urchin fishery. Acheson (1997) has shown that typically changes of DMR inshore fishery management have come from industry pressures rather than DMR initiative. He finds only two exceptions to this pattern, the recent initiatives from the federal government, and one case of initiative coming from charismatic leadership within the department. The inshore habitat of the sea urchin kept it from the gaze of federal managing bodies. From within the DMR, the sea urchin fishery was met with disinterest rather than innovations. Many considered the relative size of the fishery unimportant. Even in the early 1990s, the Commissioner of the DMR told fishermen the sea urchin industry would never amount to anything. The only sign of concern came in 1987 from the University of Maine Sea Urchin Project Committee. The committee included biologists from the university and the DMR. Although concerned about the long-term potential of the fishery, this group chose to conduct research on the biology and ecology of the green sea urchin rather than limit access to the resource[29].

Along with the lack of historical precedent for limitation and the unlikely initiative for establishing one, the State, from the Governor to the DMR, pushed for development of the fishery resources. Governor Brennen considered development of

[29] In personal communications and "New Sea Urchin Harvesting Industry May Boost Washington County Economy." by Mary Anne Clancy. Bangor News Oct. 2, 1987. In 1982, in contrast, zoologists from the University of New Hampshire were encouraging harvest of sea urchins due to their unusual growth and expansion of population (see Chapter 1).

Maine's fisheries consistent with the State's history and way of life. As we saw in the last chapter, underutilized species and foreign markets were important strategies for expanding the fishing industry. Although the sea urchin was not a target species for development, its establishment helped the state to move in the proposed new direction. The push towards development created little interest in establishing limited access to the new fishery.

Informal Limitations

Informal limitations to working in inshore fisheries do exist along the Maine coast. The lobster fishery is both the largest inshore fishery on the coast and the most territorial (Acheson, 1987, 1988). The informal control of access includes the assertion of property rights over an area related to a local harbor. Acheson (1987:40-45) finds two types of territories claimed by gangs. In nucleated territories gangs share a strong sense of ownership close to the mouth of the harbor where they anchor their boats, but that sense of ownership weakens with distance from the harbor. In perimeter-defended territories gangs share a strong sense of ownership based on outermost areas, which they defend closely. The defense of areas remains informal, and sometimes illegal. It might be verbal sanctioning, or the marking of buoys as a warning. This can escalate to the destruction of traps, an illegal act. Acheson (1988) has documented a few cases where the conflicts escalate to "lobster wars" between gangs defending territories.

The harbor gangs defend their territory against encroachments by other gangs, but they also regulate the entrance of new fishermen. In order for a new participant to move into the lobster fishery, a harbor gang must accept the new person. The fishing grounds for the sea urchin fishery cover areas very similar to the harbor gang territories, but the

harbor gangs did not limit the entrance of new fishermen to the sea urchin fishery. Two factors contributed to this lack of territorial enforcement. The species-specific character of harbor gang territoriality was one factor discouraging interest in the sea urchin fishery. The harbor gangs' territoriality operates solely within the lobster fishery and their control of production does not extend to other fisheries. As one lobsterman says, it just doesn't work the same way with other fisheries:

> Scalloping, for example, traditionally there's been a lot of boat movement. It's not unusual for there to be 4 or 5 scallopers tied up in the harbor from where I work. Same in Winter Harbor even more so.

The same lobstermen who would strictly defend intrusion of lobster boats in their harbor are willing to tolerate a new boat working in another fishery.

A second reason for the disinterest of the harbor gangs lies in the unusual qualities of the fishery. The sea urchin was long a nuisance to the lobster fishermen. Urchins move in packs, and cleaning them from lobster traps took up the time of lobstermen every fishing day. For the lobsterman the sea urchin fit the definition of a trashfish perfectly, worthless and trouble. Their distaste for the creatures is reflected in the common name given to the urchin, "whores eggs." It is little surprise that a lobsterman did not want to lay claim to such a species.

> The lobster fishermen hate the urchins. We'd like to see every one of them gone, cleaned up. Yeah, come on in; get them the hell out of here!

Along with the nuisance quality of the urchin, the SCUBA technology used in the fishery also discouraged interest of the lobstermen. As one lobsterman told me, "If God had meant us to be underwater he would've given us gills." When SCUBA divers started fishing for urchins, they were often met with derision from the local lobstermen.

> They used to look at me and say, 'oh, you must be crazy to jump out of a perfectly good boat.' They used to tell me that. And they'd tell me,

> "Christ sakes, I wouldn't go urchining. Whore's eggs, Christ, I wouldn't do that if you paid me."

The SCUBA technology and the distaste for sea urchins encouraged the lobstermen's disinterest in control over participation in this new fishery.

Rather than being excluded from or allowed only limited access to the new fishery, urchin harvesters found the sea urchin fishery an open productive system. Limitations on access might have come from the State of Maine, which held formal rights over the ocean resource. However, with no precedence for limiting access, and with the push towards developing new global markets Maine chose to leave access to the new fishery open to all interested participants. Strong communal ties and territoriality often lead to informal controls of production in inshore fisheries. The harbor gangs documented by Acheson have these characteristics, but because of the species-specific character of the gangs and the unusual aspects of this species, they did not limit entrance of outsiders to the fishery. Instead, lobstermen often facilitated this move by providing access to the fish stocks by sharing knowledge and their boats. This type of activity, switching to new fisheries and cooperation between existing fishermen and the new sea urchin divers is a common form of organization found in industrial districts.

Flexible Production Strategies

We saw in Chapter 2 that traditional entrepreneurs held certain relations with local harvesters that gave them an advantage for moving into the new sea urchin fishery. Those relations, or social capital, provided a flexibility that allowed easy adaptation to the developing sea urchin market. A similar flexibility exists in the harvesting sector of fisheries that reduces the capital investment participants need to move into a new fishery

such as the sea urchin. Piore and Sabel (1984:17) define flexibility in production as a strategy of permanent innovation, of constant accommodation to ceaseless change rather than an effort to control it. Productive flexibility is commonly associated with industrial districts.

In his research on the putting-out system of textile production in the Emilia-Romagna region of north central Italy, Lazerson (1993) distinguishes between technological and social flexibility. Technological flexibility refers to the ability to apply certain technologies to new tasks and easily meet changing demands. Social flexibility refers to the ability to recombine relationships—to initiate and end cooperation regularly—allowing adaptation to changing market demands. The working waterfront resembles industrial districts in both technological and social flexibility. This is combined with an intellectual base that can be adapted to production in other markets[30]. Of particular interest to this analysis, the flexibility of production allowed participants to move into the sea urchin fishery with low capital investment costs. High investment costs might have discouraged movement into the new fishery, and limited access to some interested participants. However, the existing material and intellectual infrastructure of the industrial district, its flexibility in particular, further opened access by allowing harvesters to move into the sea urchin fishery with little capital investment.

Technological Flexibility

The inshore fishing vessel and the fishing gear used on these vessels provide a flexible workstation for the inshore fisherman. Hundreds of inshore fishing vessels line

[30] Sabel and Zeitlin (1985) find a similar knowledge base in other industrial districts, where "the mysteries of the trade become no mysteries; but are as it were in the air (Marshal, 1922)." Although knowledge is

the northeastern coasts working in a number of fisheries including lobsters, scallops, and quahogs (Acheson, 1988; Wilson, 1980). Each vessel is unique given the preferences of the operator, and the gear and fisheries within which they primarily work. The vessels share two qualities: their size—compared with the offshore vessels the inshore boats are relatively small (under 60 feet, lobster boats under 42), and their ownership—inshore boats are predominantly an owner operated fleet (see Acheson, 1988:44-45; Patterson and Smith, 1981; Acheson et. al., 1980). The small, owner operated boat is like a floating workstation giving the fishermen access to the oceans resources.

An inshore fisherman's boat allows adaptation to the uncertain movement of fish populations, and the species switching strategy of inshore fishermen (Acheson et al., 1980, 1981:291-2). A small inshore boat is limited from the offshore fishing grounds, but its small size and maneuverability allow it unlimited access to the many nooks and crannies of the northeast coast. Fishing requires following the migration patterns of a target species as they move within this inshore region. Fish populations change over the course of a season, and from year to year. For Jimmy Newman, a downeast lobsterman, following the movements of a fish population is the challenge of the occupation.

> Lobsters are a migratory species and basically, you accumulate knowledge and you take that; you shift traps here, you shift traps there, you wait here, you wait there. It's like having 550 chess pieces. I move traps every day, trying to get a rhythm going. And then every season's different. Certain aspects they do the same, or you think they do the same. So, a lot of time you're thinking about what's going on down there. It does you no good to be one day behind the lobsters.

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not equally distributed between all participants, within the district as a whole knowledge develops through adaptation to persistent change that allows easy application to new productive pursuits.

The persistent change of the fish populations makes the work interesting, but requires a flexible technology to adapt to the change. The fisherman's boat is uniquely suited to the uncertain and necessary adaptation of fishing.

Inshore fishermen often switch effort between species, and the ability to outfit a boat with different kinds of gear makes this adaptation possible. Jack Benjamin works in the lobster fishery in the summer and fall hauling traps. In the winter he can move into the offshore lobster fishery or outfit his boat with a dragger and work in the scallop or urchin fisheries.

> I got lobsters up until after New Year's. Then take the traps all up is what I'd normally do and then we'd put the dragging gear in and drag urchins and scallops until the 15th of April. But the urchins usually died out the last week of March.

The inshore lobster season slows in the winter when the lobsters move farther off shore. Benjamin could follow the lobsters offshore this time of year. However, because of the flexible character of his inshore fishing boat he can switch gear and move into other fisheries until April when he moves back to hauling lobster traps inshore.

Just as a harvester can outfit a boat with different gear in order to adapt to new fisheries, they can adapt specific gear for different species as well. Most fishermen have worked with different types of gear in their careers, and have developed their own style of rigging gear to suit their particular tastes. This was the case for Wendell Cunningham. Similar to Benjamin, Cunningham was catching lobsters when he first decided to try the sea urchin fishery. Before catching lobsters, Cunningham worked in the offshore scallop industry for years, and was able to adapt a scallop drag to suit the specific needs of the urchin fishery.

> Every fisherman has his own idea on how to rig his fishing gear. I try to rig my drag so that it equally fishes, as well on scallops as it does urchins.

> Because there will be certain days that I will go to an area, where I might not fish on a lot of urchins, but I'm getting a percentage of scallops to go with them. So, therefore, at the end of the day, I'm looking at a combination of revenue from scallops and revenue from urchins for my total days catch.

Cunningham was able to outfit his boat with the dragging gear to switch from lobsters to the urchin and scallop fisheries. The dragging gear itself is also flexible, and a fisherman can rig it in his own way based on his current needs. Cunningham developed a drag that could work in the scallop and urchin fishery rather than one or the other. Benjamin considered a drag suited only for urchins, but decided to modify a scallop drag instead because of the uncertainty of finding urchins on any given day.

> It's just a hit or miss thing. You can spend the whole damned day looking around and you may not find anything. But most of the time you get enough to make a day's pay and pay your fuel bill anyway... We were getting 20, 30 pounds of scallops a day to go with the urchins, and the scallops are 6, $7.00 a pound. So, we made another $150, $200 a day just on the scallops. The scallop drag wasn't a real heavy drag. It was a four foot chain sweep, but it was light, fairly light. So, it worked okay.

Along with the flexibility of the inshore boat, the ability to adapt a drag made it easy to move into the sea urchin fishery. Fishermen like Cunningham and Benjamin did not need to invest in any new technology to try the new fishery. With a little time spent on adapting the boat and gear, they were ready to harvest.[31]

Social Flexibility

The technological flexibility allowed many fishermen to move into the new sea urchin fishery without significant capital investment. Using their boats and adapted

[31] John Green's experience rigging drags in the scallop fishery allowed him to adapt a drag to the sea urchin fishery. Green, sensing the potential of the new fishery, began to market his drag to other fishermen interested in moving into the new fishery. The "Green Drag," as it became know, sold along the coast from Massachusetts to Nova Scotia. (John Green, personal communication). Green had the initiative to market the adapted drag, but the adaptability of the inshore boat allowed for this marketing strategy.

dragging gear, the sea urchin fishery offered a low risk opportunity for many inshore fishermen. Along with the technological flexibility, a number of fishermen moved into the new fishery using cooperation, or social flexibility, common in industrial districts. One type of cooperation exists between the traditional entrepreneurs and the inshore fishermen. Inshore fishermen and entrepreneurs often cooperate in order to explore the possibilities of new fishery products. Take the relationship between Gene Farrell and Phil McGuire. McGuire has been working on the waterfront all his life. He bought his own boat first and now he owns Near Coast Lobster with a dealer's building on the waterfront. As Farrell says, McGuire is always looking at something new:

> He was always the first, he was the first guy in the town to do the sea cucumbers, and he was the first guy to do the sea urchins. He was always on the cutting edge of anything new, like that.

Farrell grew up in Nearcoast also, and runs his own gill net boat. He and McGuire are often collaborating on new projects.

> He was always asking me, even in the summer, he's asking me for the roe and the milk from codfish. He says Japs like it. He used to have me save that. He even wanted us to bring in, one time, sea anemones. We get them in the nets, they're red, and they sting you know. And he wanted us to start saving them, but he wanted them a certain color. But we don't catch them the color that he was talking about. Yeah, he's always got some strange thing that he wants to try.

McGuire and Farrell collaborate on new projects like this often. Some work out, and some do not, but each project requires the market knowledge of McGuire's, and Farrell's knowledge of fishing. Through cooperation, these types of relationships between fishermen and traditional entrepreneurs provide a social flexibility that could not exist separately.

These social relations are not exclusive partnerships between pairs, but are a part of the economic life of the waterfront. McGuire does not collaborate with Farrell alone.

For instance, when first exploring the Northwest Atlantic sea urchin fishery McGuire and a Japanese businessman wanted to get a sample of the Northwest Atlantic green sea urchin. Collins went down to the local wharf to see who was around and ran into Chuck Anderson. Anderson had just graduated high school and had his own 30' lobster boat that he had also outfitted with a small drag. Anderson caught lobsters in the summers long enough to know where he could find sea urchins.

> I knew where there was plenty of sea urchins. I didn't know what they wanted, what to look for. The Japanese guy went right aboard the boat with me, I took him right out, and he showed me what he wanted. He taught me what to look for. We set it up that [Phil] bought the urchins and shipped them to him. That's how I first started. The first couple years I went I never even had a boon or nothing. I just hauled it up by hand and dumped it on the floor.

Anderson and McGuire shipped the first sea urchins to Japan out of Nearcoast Harbor, and they worked together for the next few years. As Anderson says, it is funny how it happens, but those kinds of things happen a lot. Collaboration and exploring new opportunities is part of the waterfront mentality:

> You get a strange bug in the trap, you got to look it over and see what it is, wonder if you'd make money at it. Always thinking of different ideas.

The traditional entrepreneurs often have the knowledge of the markets that gives them an advantage in finding new opportunities. However, they could not pursue the ideas without the fishermen's cooperation. The initiative does not always come from the buyer, either. As Pete Peters, an inshore buyer, points out, often times the harvester first sees the potential for a new market and initiates the cooperative relationship with a buyer.

> Everybody's kind of looking. If somebody's doing sea urchin, they come home with a boatload of sea urchins, then [the boats I work with] start asking me, and, it's time to look into this.

With buyers watching markets, and harvesters watching other harvesters, collaborations develop that allow movement into new fisheries with the changing opportunities.

Another kind of social flexibility among harvesters developed in the sea urchin fishery that allowed easy movement into the new industry with low investment costs. This developed through collaborations between boat owners and SCUBA divers. A fisherman interested in SCUBA diving for sea urchins could obtain the appropriate gear, and training for under $2000. A small investment for moving into the new fishery. However, the SCUBA equipment and training alone could not get the diver access to the ocean; they needed a boat. Some divers secured anything that would float in order to get access to the ocean, resulting in some precarious boats on the water. However, more often divers established relationships with existing boat owners. This was how Will Tucker got access to fishing grounds:

> You usually go out on a boat. Usually a lobsterman, someone who knows the fishing grounds and stuff, and it supplements him pretty good. We give a 30% commission to him. We have 2 other divers, 3 divers on the boat. So, he does pretty well as a supplemental thing.

The winter is a slow time for many fisheries, and the sea urchin fishery provided the boat owners with work on the water during these times. For three winters Farrell took divers out on his gill net boat before he started to dive himself:

> The first year I got my boat, and I was wondering what I was gonna do in the winter. And some diver called me and wanted to know if I wanted to go out and try it. So, I took him just right the other side of an island here. We did that for like 3 or 4 days and after that, I got lined up with 3 different divers.

For the boat owner the collaboration offered work on the water in the slower winter months. For the diver the boat owner offered access to the ocean with no investment costs. The boat owner also brought an existing knowledge of the ocean to the

relationship. This gave the diver access to the ocean through the boat, but also access to sea urchin populations through the sharing of the boat owner's knowledge. Farrell just knew where to find urchins:

> Divers would show up here and they didn't have a clue. They didn't even know where they were going... I just knew a lot of places from lobstering. Places that have lobsters have urchins.

Through their partnership with the boat owners, the divers secured access to the ocean, and they secured a working knowledge of the ocean, which provided access to sea urchin populations.

The collaborations between divers and boat owners take many different forms. There may be a partnership between one diver and a captain, or there may be multiple divers working with a boat owner. The partnerships often last one season, but may last only part of a season or over a number of seasons. Newman has participated in a number of different partnerships as a boat owner working in the sea urchin fishery:

> Me and Crazy Mike did it. I think we only did it in the springtime that year, like February, March, April. I worked with Mike and then I think it was with this guy I'm with again now, I think I worked with him the year after that... Then there was a couple years with those two high school kids. Actually sometimes a couple, 2 or 3 years of working with somebody will do it. I mean, we still get along.

Newman's collaborations with divers have a fluid character. They could end at any time, but they often last a season, or in the case of the high school students, they last a few years. Although they often last, participants can end collaborations easily, and renew them at another time, as is the case with Newman's current partnership. Among participants, there is an understanding of the social flexibility taking place that allows it to work smoothly. Newman and his current diver stopped working together when Newman wanted to switch to the sea urchin fishery in the early fall. The diver was not

ready to start that early, so Newman set up with the high school students. When these two divers decided to get their own boat the partnership ended on good terms[32]. The lobster fishery was doing very well that year, so Newman hauled traps through the fall. His boat was open after this so he and the diver he had worked with a few years earlier started working together again. In this way, productive relations are recombined in a flexible process that allows easy adaptation to changing market circumstances.

The social and technological flexibility of the working waterfront is similar to the industrial districts found in other regions of the world. This flexibility allows easy adaptation of production to changing market opportunities. As the market for sea urchins began to develop, the flexibility allowed participants to move into this new fishery with little human or physical capital investments. With few limitations on entry to the sea urchin fishery from the state, informal territoriality, or necessary capital investments the fishery came to resemble an open access resource as described by Hardin. With the growing demand in Japan and among entrepreneurs on the Northwest Atlantic coast, the harvesting sector was ripe for rapid growth. Next, I look at who did and did not take advantage of the new opportunities.

Harvester Career Strategies

In the fall of 1986, Will Tucker's neighbor, a local lobsterman, told him about a new industry getting started. Some guys on the waterfront were SCUBA diving for sea urchins. Tucker had just built a house, and was starting a family. He worked construction in the warmer months, and bounced around in the winter making a few

[32] As we will see below, the decision to buy your own boat makes sense to fishermen as part of the career path in inshore commercial fishing. Newman's partnership with the high school students ended on good terms given this understanding.

dollars where he could. Considering the industry's prospects good, Tucker took a SCUBA course, bought a commercial fishing license, and started harvesting sea urchins. At that same time, Adam Rock was attending high school in a small downeast town. Coming from a long line of fishermen Rock had already started his career on the water by working on local boats and diving for scallops. When some divers from out of town came and started harvesting sea urchins he decided to try the new fishery. The next year he quit school to become a full time urchin diver. Participants such as Tucker and Rock came from diverse backgrounds, and with the institutional arrangements of the working waterfront, they were able to move quickly into the new fishery.

The harvesters in the sea urchin industry appear to come from three separate social contexts based on their previous experience in commercial fishing industries. These differing positions in turn lead to different career strategies employed by the harvesters when they approach sea urchin harvesting. The first two groups fall under Miller and Van Maanen's (1982) conception of traditional fishermen. Those in the first group were already established in commercial fishing when the sea urchin fishery got started. The second group of urchin harvesters came from commercial fishing communities or families but were young and not yet established in a fishery. The third group falls under Miller and Van Maanen's (1982) conception of non-traditional fishermen. They came from a diversity of backgrounds outside of the commercial fishing industry and started their career in commercial fishing with the sea urchin fishery.

Established, Young, and Non-Traditional Fishermen

A single fishery operates for a fraction of the year based on seasonal cycles. As a result, inshore fishermen often move between fisheries during the ups and downs of

specific species cycles (Acheson, 1981; Dewer, 1983,1986). The winter is a notoriously slow time for inshore commercial fisheries along the Northwest Atlantic. The sea urchin fishery is unusual in that harvesting peaks in the winter. When the inshore buyers were looking for harvesters in the new fishery, they often turned to the established fishermen. By established I mean that they already owned boats and gear for harvesting in other fisheries. These technologies were easily adapted to new fishery opportunities. In addition, being established includes having existing social ties and reputation among buyers and other harvesters. Being established allowed these fishermen easy movement into the new fishery, but they viewed the sea urchin fishery as a supplement to their existing fishing.

Commercial fishermen, particularly small-scale fishermen, tend to resist changes and innovations in general (Acheson, 1981). Often this resistance results from inertial pressures stemming from an established career position (Hannan and Freeman, 1989). The established fishermen along the coast often approached the sea urchin fishery with this resistance. However, a second group of harvesters did move into this new fishery enthusiastically—fishermen at the beginning of their careers, and not yet established in a particular fishery. Like Adam Rock, these fishermen were not yet committed to any fishery, but becoming established was already a career goal. One can find similar career motivations around the world (Acheson and Reidman, 1982; Middleton, 1977; Wadel, 1972; Goodlad, 1972). Early in a commercial fisherman's career, an opportunity like the sea urchin fishery is an opportunity to establish a career in commercial fishing.

The established and young urchin harvesters came from a tradition of inshore fishing. As Miller and Van Maanen say, they are fishermen until they somehow

demonstrate that they are not (1982:32). They had already become independently established in a commercial fishery, or they come from the commercial fishing social context through family, friends, and experience working on the water. A final group of harvesters did not emerge from the commercial fishing context. Instead, they came from the land where they worked in any number of other occupations. This group follows more closely the economic model of labor movement. Many came from the construction industry, which was in recession in the late 1980s and early 1990s and has a slow winter season. Economic pushes and pulls lead them to the sea urchin fishery, an occupation with little human or physical capital requirements at the time of their movement.

Career Strategies of Established Harvesters

With the lack of barriers to entry in the harvesting sector of the sea urchin industry we are left with the question of why some workers did or did not move into this new fishery. Two possible answers follow from the economic sociology literature. First, some workers may hold an advantaged position within networks that provides access to important information about new opportunities such as the sea urchin industry. In addition, some workers may have knowledge of the new opportunity, but decide not to take advantage of it given inertial pressures of institutional arrangements. Much of the recent sociological research on labor markets shows that the flows of information through networks of personal relationships explains the matching of workers with opportunities. Granovetter (1973,1981,1985) has found most jobs are filled through a personal connection that provides information about an opportunity. Workers rely on personal relations to provide an evaluation of the prospective job that can be trusted above all others. Tilly and Tilly (1994) describe two separate networks, recruitment, and supply

networks that become linked in the matching process. Examination of immigrant labor movements has shown that, once linked, these two networks often stay together resulting in a similar labor force moving into similar occupations (see Light and Karageorgis, 1994).

On the working waterfront, the network explanations do not appear as salient, however. Here existing productive relations already link recruitment and supply networks, and these networks extend into the local community through kinship and friendship ties. When a new market comes along and an inshore buyer like McGuire needs someone to harvest he can turn to a set of existing relations to fill the position. As we saw in Chapter 1, inshore buyers accomplish recruitment quickly and easily, seemingly without effort. For the harvesters, the process was similar. Drew Taylor learned about the new fishery through the regular productive activities on the waterfront:

> Well, they just started buying them down at one of the local wharves, Seaside. It isn't open now. And it was just money in the winter as compared to nothing.

Farrell first heard about the sea urchin industry when he was still working as a hand on other fishermen's boats:

> There was a couple draggers. They used to just drag for them around here first. And I went with a few guys that needed a hand one-day. We used to go up Casteen and all around.

Adam Rock was scallop diving when he first learned about the sea urchin industry:

> Yeah, I'd been scallop diving one winter and some Portland divers came up this way, got on the boat that we were scallop diving.

Benjamin had already seen divers at the local wharf when he decided to give dragging a try:

> Someone I knew had decided to go drag some with a scallop drag. And if I remember right, we didn't need a license at the time to drag urchins. So,

> we went over and tried it. And when we went in to sell them, the guy handed me a check, I thought, this isn't so bad. We went all that winter.

Learning about new opportunities as did the fishermen above is part of the waterfront; their stories are matter-of-fact. These fishermen were not doing anything special, they were participating in the inshore fishing industry and as a part of that process participants become aware of new opportunities like the sea urchin fishery. As Taylor says, when a new fishery starts fishermen might "be closed mouth, stuff like that. But somebody's gonna find out eventually. You can't keep it secret forever." The dense production networks that surround the waterfront eliminate the information problem in the matching process, but fishermen still do not universally take advantage of new opportunities when they arise. Instead, the decision to take advantage of a new opportunity depends much more on their career strategies.

There are three institutionalized strategies of an inshore fishing career along the waterfront, which influence a fisherman's decision to take advantage of a new opportunity. The strategies are problem solving routines embedded in the institutional arrangements of the waterfront, and that become a part of the conscious thought of participants in the productive arrangements (DiMaggio, 1990; Swidler, 1986). First, there is a strong commitment to working on the water. Fishermen have been found to have a strong commitment to their work compared with other occupations (Acheson, 1981), and the commitment becomes part of a social identity (Miller and Van Maanen, 1982). The identity is woven into the lives of participants, considered natural:

> My father-in-law's a fisherman and he told my wife when she complained about all the time I spent out on the water. He told her "there's no sense in bitchin' 'cause it was in my blood and she wasn't gonna haul me away from it." As long as I can make a living on the water, I will.

This commitment is key to understanding the tenacious way in which fishermen attempt to maintain their careers on the waterfront in the face of many obstacles. Rather than pursue any opportunity fishermen are committed to making something out of the opportunities on the waterfront.

Once an inshore fisherman makes the commitment to commercial fishing, he becomes invested in a particular fishery. One aspect of the commitment includes making a capital investment in the core technologies of a vessel and gear (Levine and McCay, 1987; Wadel, 1972). Wadel's (1972) examination of the purse-seine herring fishery in Norway remains an excellent example of this process. A career fisherman first works as a hand on a boat receiving a share of the value of the catch. At this point in his career, the harvester is attempting to save money in order to invest in some core technology in the future. In the Norwegian herring fishery, the core technologies are a fishing vessel and net gear. With this initial investment, the fishermen then collaborate until they can invest in the other core technology of the fishery (Wadel, 1972:108-115). Investment in a fishery is more than capital investment, however. It includes social investments in productive relations and in building a reputation. Once working in a fishery a harvester establishes ongoing relations with buyers and other harvesters in the productive process, and reputation can establish a fisherman in the status system of that fishery (Acheson, 1981). In this way, a fisherman becomes a lobsterman instead of a groundfisherman.

Research on the adoption of technological innovations finds that a commercial fisherman's decision to adopt a new technology depends on their career situation when opportunities develop (Levine and McCay, 1987; Acheson and Reidman,1982). Adopting a new technology often includes establishing new relations and a reputation in

a new market. As fishermen become more established in a fishery their productive relations become institutionalized in an already existing structure of roles, authority and communication. As Hannan and Freeman (1989) argue, these existing structural relations encourage inertia in their economic actions. Goodlad (1972) for instance found that only some Shetland Island drift net fishermen were willing to adopt the new purse-seine technology in the herring fishery. Adopting the new technology would pay off economically, but would mean working in a different market. Established fishermen, with boats, gear, ongoing ties, and reputation were not willing to give up this investment for a new fishery. It was the less invested fishermen, typically younger, who were anxious to adopt the new technology in order to establish their fishing careers.

Inshore fishermen typically invest in a primary fishery when establishing their careers. However, most fisheries are seasonal and are prone to unpredictable fluctuations in the resource, markets, and government regulation. Therefore a third strategy of working in more than one fishery has developed. In some cases fishermen switch to different fisheries over the course of a year based on the reproductive cycles of the species or state enforced seasonal restrictions (Levine and McCay, 1987; Dewar, 1986). In this way, a fisherman can patch together a living over the year by combining work in more than one fishery. In other cases fishery switching takes place over the course of a career. As the resource, government regulations and markets change fishermen exit and enter fisheries in order to patch together a career over many years of fishing (Acheson, 1981).

These three waterfront career strategies influenced workers' decisions to move into the new sea urchin industry as it developed. Some fishermen were already

established in fisheries that carried them through the year successfully. This group was not likely to move into the new fishery. Other established fishermen did choose to supplement their primary fishery by working in the sea urchin industry during the winter. Due to changes in resources, markets and state regulations these fishermen needed to take advantage of an opportunity like the sea urchin industry. Still others were working in primary fisheries that were in decline based on the resource, market, or state regulations. For this group, the new fishery was an opportunity for a new primary income source. These three strategies combined to motivate harvesters' decisions to move into the sea urchin industry. While some fishermen moved into the fishery simply to take advantage of a potential opportunity, for most the new opportunity came at a time that it suited their career in commercial fishing to move into the fishery.

Some harvesters were risk takers, harvesting sea urchins to try and make some money while they could. Benjamin was a successful inshore lobsterman, and could lobster offshore in the winter if he wanted. Instead, he would move into the scallop and urchin fisheries to take advantage of the financial opportunities. The first day of the scallop season can bring in a lot of money, as can the sea urchin fishery in late December. Alley is unabashed about taking advantage of those opportunities:

> Guys used to get upset with me, they'd say, "he's a damned hog. He wants everything." Well I lobster and got 1,000 traps in the water and I rig up and go scalloping the first day of November. We only drag 2 or 3 days and we make pretty good money for those first 2 or 3 days. Take it out and go back lobstering. They can do it, just like I can, but they don't have the motivation. That's why I'm in it, I'm in it to make all I can make.

Benjamin is established in the lobster fishery. He fishes many traps, and holds a federal offshore license that allows him to follow the lobsters offshore in the winter. However,

he takes advantage of the flexibility of his boat and gear to move into other fisheries at particularly good times in the market.

Other established fishermen did not move into the sea urchin fishery at all. Rather than jump around like Benjamin, they were firmly enmeshed in their primary fisheries and saw no reason to jump around.

These decisions can be understood as a combination of inertia based on the commitment of fishermen to their primary fisheries and the success of those fisheries at the time of the opportunity. As the sea urchin fishery grew so did the lobster fishery, and firmly established lobstermen had little reason to abandon their primary fishery. Benjamin's commitment, for instance, has remained with lobsters. Similar to the traditional inshore buyers in Chapter 1, Benjamin views these other fisheries as supplemental. His real commitment is to the lobster fishery, and his commitment to scallops or sea urchins depends on his involvement with the lobster fishery.

> Well, I'm primarily lobster. We mostly urchined for 2 or 3 years in the wintertime. I went into it with the idea of paying my bills and getting me through till spring when lobstering got going again. The last couple years have been really, pretty good years. So last year, in 1996, we lobstered until the first of February and then we took traps up. And then this year I moved traps all winter. It was a very good lobster year.

Benjamin primarily works in the lobster fishery. Come wintertime, when the inshore lobster industry fades Benjamin has many options for work. He has the federal permit and the gear to move offshore in the lobster fishery, and he also has the dragging gear that enables him to work in the inshore scallop and urchin fisheries. However, in the end, his primary commitment is too the lobster fishery, and his decision to move into the urchin fishery depends on his interests in his primary fishery. For the last couple of years, he has decided not to fish for sea urchins.

Not all fishermen are in the advantaged position of Benjamin. Newman has been a lobsterman for 15 years, but he is not able to fish offshore in the winter. Lobster fishing offshore requires a larger boat, gear, and a federal lobster permit to fish outside of the three-mile limit. Many fishermen who fish for lobsters in the summer and fall are unable to go offshore, and must rely on other fisheries in the winter. As we saw above, Newman created partnerships with divers who used his boat for a diving platform, and he has worked in the sea urchin fishery since its early years. Similar to Benjamin, Newman's interest in the sea urchin fishery has waned in the last few years due to a seasonal conflict with the lobster fishery. The lobster season carries on into the fall, overlapping the sea urchin season. When it comes to deciding between fisheries, Newman sides with his primary fishery:

> I'm not gonna quit lobstering early anymore to go urchining, definitely not. I'm gonna fish till November 1st, November 10th, regardless. Whether it be sacrificing a diver or not. This is what I do, this is what I'm gonna be doing as long as I live and I like to do it. You know, my main thing is lobstering. I love to catch lobsters. And that's what I'm gonna be doing for the rest of my life. And this urchin industry was exciting. It was fun.

Not getting started with a diver at the beginning of the sea urchin season can mean not working in the sea urchin fishery at all for Newman. In past years Newman has stopped lobster fishing a little early in order to get started with a diver. However, the lobster fishery is doing well, and Newman is primarily a lobsterman. Sea urchins were always a supplement to his work in the lobster fishery.

Many fishermen were dragging in the scallop, quahog, or oyster fisheries before the sea urchin industry began. Some were lobstermen who outfitted their boats with small draggers in order to work in these fisheries during the winter months. Other draggers worked primarily from larger dragging boats that could work farther offshore in

the scallop and groundfish industry. These fishermen based their decision to move into the sea urchin fishery on the relative success of these other fisheries, also. Cunningham was primarily lobstering, but without an offshore license, he turned to scallops in the winter months. At the time scallops were doing well so Cunningham didn't move to urchins:

> So, I didn't get into it for a couple of years. I was scalloping. At that time the scallop industry along the Maine coast was doing real well... Some guys that didn't have the larger boats and equipment were looking for something to do in the winter and it was a blessing for them to have something to be able to revert to in the winter.

As the scallop fishery held out Cunningham did not see the need to move into a new fishery for those winter months. However, as the scallop industry remained stable, the prices in the sea urchin fishery began to rise and Cunningham moved to take advantage of the opportunities. For Taylor sea urchins provided an opportunity to replace an unstable fishery:

> I used to drag oysters, and the oyster population was getting low and I just figured I'd try something different.

Taylor held an offshore lobster license, but did not have a large enough boat to work off shore. Instead, he worked in the oyster fishery, which had seen a short period of growth along the southern coast of Maine in the early 1980s. Similarly, the quahog fishery in downeast Maine had seen a period of sharp growth, but catches were not stable and many draggers moved to sea urchins when the new fishery got started.

Not having to establish a partnership with divers, draggers using the sea urchin fishery as a supplement could enter the fishery without interrupting their primary fishery. However, the interest of some draggers in sea urchins has waned due to their investment in a primary fishery. For instance, Anderson has been dragging sea urchins since the

beginning of the industry, but he is primarily a lobsterman. Sea urchins were always a supplement, and he does not have the established relations in the urchin fishery as he does with lobsters. This lack of established social relations has lead him to rely less on the new fishery:

> Another day at the pier. I tell you I never look forward to going in there. There was not one day where I ever looked forward to going in there. Not since this starting bidding for them. I'd like to see it straightened out. Just come into one of these Dealers here, drop them off, get paid a fair price. Don't have to argue and fight for your money. Don't have to worry about being here at 1 or 2:00. Never have to worry about someone being there to buy them.

Anderson would like to have the sea urchin industry look more like the lobster industry with which he is familiar. With the growth in buyers and the turnover, he does not have the established relations he finds in the lobster industry. As a result, he has turned away from sea urchins in the winter, only harvesting a few days in December when the lobster fishery is slow.

Career Strategies of Young Harvesters

While established fishermen saw the sea urchin industry as a supplement, a second group considered it a start. These fishermen worked on the waterfront, often held kinship ties to the waterfront community, but had not yet become established in a fishery. These fishermen, typically young and at the beginning of their careers, did not own their own boats and had not established a reputation with buyers in any particular fishery. Sea urchins were a chance for young harvesters to establish themselves, not as a hand on a boat, but as a fisherman.

Dave Bogan's father was a small inshore buyer in downeast Maine. Bogan started working on the water, right out of high school, as a stern man on lobster boats in

the summer and on shrimp boats in the winter. While working on shrimp boats, Bogan had seen urchins landed at some of the wharves. Soon after that, an inshore buyer recruited him to try diving in the new fishery:

> I got started in the summer with a wet suit and used equipment. I probably had $600 $700 invested, couple hundred in licenses. The initial investment was minimal... Everything just fell into place. The wharves were already there; the boats were there.

Bogan was able to get into the new fishery easily with a minor capital investment, and the existing infrastructure of the working waterfront in place. With the sea urchin he was no longer a hand on someone else's boat, but he was a fisherman establishing his own relations in the new fishery. Adam Rock tells a similar story. He had already been SCUBA diving when the sea urchin industry got started:

> The reason why I went diving is because I got out of high school and diving was something to do to make a living. I've been fishing my whole life. My father was never a big lobster fisherman, so I wasn't either. I decided to try [diving] then.

It was through his diving in the scallop fishery that Rock found out about the new sea urchin fishery. A few urchin divers from Portland came and worked from the same boat he was scallop diving from:

> You could see that the divers were making $2,000 to $2,500 a day. And we were making $150 a day scalloping. And it didn't take long to switch over. The first day of the winter I made $340 and then just got better from there. And then I went 3 or 4 years with other people on a small boat of my own.

For Rock the sea urchin industry was his chance to establish himself in his own fishery and invest in his own boat:

> Yeah. Then I bought my own boat that I have now. It's a 31 footer, diesel. I've been doing it ever since.

Rock went into SCUBA diving as a way to get started in commercial fishing. Getting the equipment and certified was a minimal investment, and he could work from another local boat as a platform. When the sea urchin industry started, it was an opportunity to follow a commercial fishing career path. He began saving money while using other boats as a dive platform. Soon he bought his own boat. Young fishermen at the beginning of their careers like Bogan and Rock never hesitated to move into the sea urchin fishery. Without other commitments, there was no reason not to invest in the fishery and become full time sea urchin harvesters.

As the new industry evolved these different approaches to working in the harvesting sector developed also. One group of fishermen, primarily lobstermen, were working in a fishery that was stable or growing. They viewed the sea urchin fishery as a supplement to their primary fishery, something to hold them over through the winter. However, the sea urchin fishery was not their primary fishery, and in some cases, they left the industry behind as a result. A second group of fishermen became more invested in the sea urchin fishery, however. Most were at the beginning of their careers on the waterfront and looking for an opportunity to invest in a fishery like sea urchins. Others moved to sea urchins from other fisheries, making a career switch by considering sea urchins a key part of their fishing activity. A third group of fishermen that Miller and Van Maanen (1982) would call non-traditional came from outside of the working waterfront context. These were workers with diverse past experiences who moved into the sea urchin fishery as they discovered a unique work opportunity.

Non-Traditional Harvesters

While the fishermen above come from the working waterfront context, another group of harvesters in the sea urchin industry comes from a variety of experiences outside of the waterfront. As Miller and Van Maanen describe them, they "posses personal biographies that vary widely from one another and from those of the traditional fishermen (1982:33)." It is hard to estimate the number of non-traditional fishermen working in the sea urchin industry, but most participants agree that it is higher than other fisheries[33]. Since they were not part of the working waterfront, how this group learned of the new opportunities becomes a relevant question. Returning to the questions posed by the economic sociology literature, we have to ask how this outside group learned about the new opportunities in the sea urchin industry, and why they decided to take advantage of the opportunity upon learning of it.

Among non-traditional fishermen, the importance of personal networks played a more important role than it had among traditional fishermen. In many cases, the non-traditional urchin harvesters learned of the new fishery through an acquaintanceship with someone who was working on the waterfront. These workers lived in the relative proximity of the coast when they heard about the new industry. Nick Sage was working in a coastal town managing restaurants when he first started fishing:

> I fell into it. I got done at Local Restaurant in June of '84, and just for the hell of it, I decided to take scuba diving course at the Y. And a friend of mine who was a navy diver had been diving for scallops for a couple years. I really didn't have anything else lined up for that winter. So, I figured why not?

Fuller had never really entertained moving into the commercial fishing industry. However, the restaurant business on the Maine coast is often seasonal, and when an

opportunity for winter employment came along Sage decided to try it. Scallop fishing was never a career, but the next year the sea urchin industry came along and Sage decided to get out of the restaurant business and become a full time commercial fisherman.

Similar to the traditional fishermen, non-traditional fishermen took advantage of the opportunities provided by the sea urchin industry when they had knowledge of the opportunity and were in a position to take advantage. Will Tucker was working in construction when his neighbor, a lobsterman, told him about the new industry:

> My next door neighbor was a lobsterman. At that time, I was having hard problems with carpentry. It was after all those big booms of the 80's. And then, I would basically die in the wintertime, and then in spring and summertime it was just work, work, work, work. So he told me, "you ought to look into this, it's looking pretty good." I still waited a year or so, you know, then I just decided to do it.

Like Tucker, several non-traditional harvesters were working in the construction industry. The years before the sea urchin industry began were boom times for these industries, employing thousands as carpenters, painters, or roofers among others. As the construction boom ended, many workers were looking for some kind of employment to make up for the decline in work. Several of these workers decided to get into the harvesting sector of the sea urchin fishery. However, information flows impacted this labor movement and it was only those who somehow heard about the opportunity that got involved. Like Tucker, some had a direct tie to the waterfront. For others, the information began to diffuse through non-waterfront networks as more non-traditional fishermen got involved.

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[33] It is hard to make this estimate for the reasons discussed in Chapter 1.

The recruitment strategies of Nicholas Cummings also had an important impact on the movement of non-traditional fishermen into the sea urchin industry. Cummings, as we saw in the last chapter, was an early business group entrepreneur. He got into the sea urchin business through his work as a commercial SCUBA diver. When he first started shipping sea urchins to Japan, he turned to other commercial divers to work in the harvesting sector. Although this group was sometimes reluctant, many commercial divers without any fishing experience began SCUBA diving for sea urchins. With his strong interest in growth, Cummings also turned to other unorthodox approaches to recruiting labor. He recruited some harvesters from California where the sea urchin fishery already had a large diving labor force, and he used the local media to promote the new industry and encourage interested workers to get involved. Cummings used local newspapers, radio, and television to spread the word about the new industry. John Myers was working as a commercial diver in New Hampshire when he first heard about the sea urchin industry beginning in Portland, Maine:

> It had been on the radio that the Japanese were considering opening up a market in the states, something of that nature. I remember going up to Portland and spending a couple days up there going from fish house to fish house and asking them if they knew anything about sea urchins. Of course, nobody knew anything. I finally got a name of one guy, I went to talk with him, and he said oh yeah, we buy sea urchins. The guy's name was [Nicholas Cummings]; he was called [the Urchin King].

A number of harvesters came to the industry in this fashion. Some came from the commercial diving industry or from the relative proximity of the coast where they heard about the new industry through personal networks. Still others moved to the coast, hearing about the new industry through the local media. As the industry developed the new opportunities drew a large number of non-traditional fishermen and they began working on the waterfront for the first time.

Labor Market Process

Work, or labor, is an essential part of any productive system, and an economic sociology of the productive process must account for the mobilization of labor in any productive system. In this chapter, we have seen that labor strategies of workers are more than the rational responses to the pushes and pulls of economic life alone. Instead, the decisions to take advantage of an opportunity are embedded in institutional arrangements that embody economic life. The particular circumstances of those institutional arrangements in turn impacts the development of labor markets and the composition of labor forces as industries develop.

Rather than a boom, it is possible to imagine the sea urchin industry falling flat—even with the Japanese consumer interest and the entrepreneurial activity. However, the unique circumstances of the working waterfront help realize the potential as production quickly and easily. The state control of access to fisheries resources, the flexible productive relations of waterfront production and the career strategies of commercial fishermen favorably combined in the sea urchin industry to allow the growth in harvesting labor markets. Although fishermen came from traditional fishing backgrounds, many were at the beginning of their careers on the waterfront becoming established in the new fishery. In addition, many non-traditional fishermen came to this new industry as other non-fishing industries went into decline. These new harvesters did not approach the new job with the sense of tradition that comes from working on the waterfront.

CHAPTER 4

EXCHANGE PROCESSES

ON AN OVERCAST AND WINDY DAY, THREE SEA URCHIN DEALERS WAIT AT A PUBIC PIER FOR sea urchin harvesters to return from a day's fishing. The wind often keeps harvesters in a small boat fishery off the water on days like this. These transient dealers have driven from Portland to a downeast public pier in order to buy sea urchins not knowing the local harvesters stayed in today. Harvesters sometimes encounter a similar problem. They will come in from a day's fishing and find no dealers to buy their product. To sell their catch they need to load their urchins in a truck and drive up and down the coast looking for a dealer. Sometimes this means driving from a downeast port all the way to Portland, a three-hour trip one-way. These cases are extremes, however. On most days, harvesters and coast-side dealers meet and exchange sea urchins. Nevertheless, these cases demonstrate an important aspect of the productive system. In each of these situations, there is a problem with the coordination of exchange within the productive system.

This chapter examines the coordination of exchange between harvesters and coast-side dealers in the sea urchin industry. I focus on the institutions that can facilitate exchange, particularly trust and the obstacles to achieving exchange relations based on trust. This analysis begins with an introduction to three distinct forms of exchange in the sea urchin industry: Long-term exclusive exchange relations, nonexclusive exchange relations, and plural forms of exchange relations.

Following this introduction, the remainder of the chapter examines in depth each of these forms of exchange. Along with the qualitative sources of interviews and field work, this analysis includes use of dealer logbooks that provide a quantitative look at the different forms of exchange that operate in this industry. There are three parts to the analysis. First, I examine the existence of long-term exclusive ties in the whole/live sector of the industry. I consider the possibility that these trusting relations evolved from the participants' rational pursuit of self-interest. However, it appears that these cooperative relations are non-calculating. Second, I examine a set of market like exchange relations that exist in the sea urchin industry. In contrast to the non-calculating relations in the whole/live sector, these relations are decidedly calculating despite conditions that might encourage cooperation and the emergence of trusting relations. Here I examine the institutional causes of this calculated non-cooperation. Finally, I examine the existence of a set of exchange relations that use both trust and market forms of exchange. These relations attempt to balance trust and market relations in a unique form that is both calculating and non-calculating.

Trust and the Costs of Exchange

For the past eight years, Nick Sage and Harvey Holtz have been buying and selling sea urchins from each other. Sage is a non-traditional fisherman, coming to the new fishery from the restaurant business. Early in his career, he began working with Holtz and they have maintained a relationship since then. Holtz has relationships like this with all his divers. He asks that his divers work exclusively with him, and in return he provides a steady market and other supports like filling air tanks at the end of the day. In contrast, Pete Kelly prefers to sell his sea urchins at public fish piers. After eleven years of

fishing, he knows many of the dealers that are still in the business, but these relations do not influence where he sells his catch. At the end of the day he takes his catch to the pier where a set of dealers have come looking to buy sea urchins. After shopping his catch around, he sells his sea urchins to the highest bidder. In both of these cases, sea urchins are exchanged across technically separate units in the productive system; transactions are completed. The transactions are completed in very different ways, however. One exchange is coordinated by a form of cooperation and one through the price mechanism at a spot market.

Markets are social institutions that facilitate exchange between buyers and sellers (Coase, 1988:8). Economic historians often view markets as exchange institutions that take place in a specific time and place. However, the neo-classical economist's market is more an abstract arena where a large number of technically separate units carry out one-time exchanges guided by self-interest (Swedberg, 1994:257-264). In the neo-classical economist's market, partners to the transaction are anonymous; the price mechanism attracts actors to the exchange and require no previous or future knowledge of exchange partners. The immediacy of the exchange and its coordination by price requires no system wide governance or control. The pursuit of self-interest and the price mechanism allow for short term relations of mutual satisfaction; the market ideal requires no lasting or integrated relationships[34]. Economic sociologists emphasize the social structural characteristics of markets, and power relations in the exchange process. In the network perspective concrete social relations structure market based exchange (Granovetter, 1985). Weber (1968) emphasized the aspects of struggle and competition that surround

market exchange[35]. He considered the exchange a struggle of the participants' interests, and between those potentially interested in the exchange there exists a struggle of competition. Following Weber, Fligstein (1996) considers the market a political and cultural construction evolving from the power struggles among actors to control competition and insure economic survival (1996:659-60).

Recently, institutional economics and economic sociology have turned their attention to another institution that facilitates exchange within a productive system: *trust*. Trust in economic relations refers to the mutual confidence that no party to an exchange will exploit the other's vulnerability (Sabel, 1993; see Gambetta, 1988). TCE assumes that parties to an exchange act self-interestedly, and that they will exploit one another's vulnerability if they can. In the ideal market, competition nullifies this potential opportunism. When ideal market conditions do not exist, the potential for guile exists and opportunistic parties can take advantage of others. Having to monitor exchange partners closely to prevent opportunistic actions increases transaction costs. TCE proposes that if the two parties exchange regularly they can eliminate transaction costs through the formation of non-market institutions that integrate the exchange. Establishing relationships based on trust and a mutual self-interest can eliminate the costs associated with opportunism.

From the TCE, perspective trust emerges from self-interested action taking place over repeated exchanges. In contrast, economic sociologists consider trust an aspect of existing social relations. In the network literature, trust is embedded in existing and

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[34] See Powell (1990), Braddich and Eccles (1989) and Williams (1985) for further discussions of the market form of coordinating exchange and for comparison with network and hierarchical forms of coordination.

ongoing networks of personal relations. The trust found in these existing relations can act as the lubricant for smooth economic relations (Granovetter, 1985). Trust becomes part of the background expectations of the exchange, the unconscious but taken for granted expectations of everyday life (Zucker, 1986). Trust can become part of the shared rules of exchange actors hold in specific contexts, also (Fligstein, 1996). These sociological perspectives consider social variables key to the establishment or disruption of trust.

Exchange in the Sea Urchin Fishery

Rather than one, there appear to be three forms of exchange dominating the sea urchin industry. The first form resembles that of other New England fisheries. Like Nick Sage and Harvey Holtz above, harvesters and dealers continue the tradition of the working waterfront and establish long-term exclusive exchange relations based on reciprocity and trust.

These long-term exclusive ties stand in sharp contrast to exchange relations governed by the price mechanism. Here price alone brings the parties to the exchange together: harvesters attempt to obtain the highest price possible for their catch, and dealers attempt to buy the catch at the lowest price they can. Rather than trust, reciprocity or a mutual self-interest, these exchanges are fraught with distrust and guile. Among dealers, the level of competition is very high and it is common for dealers to bid up the price for a harvester's catch in an auction like manner. The latter auction type competition takes place most often at public fish piers where spot markets have operated

[35] For a discussion of Weber's conception of the market see Swedberg, (1994:265) which also includes discussion of writings not yet translated to English.

for the past 5 years. Here a number of dealers come to the pier each day and harvesters shop their catch around, settling on the best offer.

A third form of exchange resembles what Bradich and Eccles (1989) call the plural form. These harvesters and dealers use both trust and price to coordinate exchange, choosing the form based on economic strategies. These plural forms do not follow one economic strategy. Instead, harvesters and dealers combine trust and price in unique ways. Some dealers will hold a number of long-term exclusive relations with harvesters in order to assure a steady supply of product, and they use the market to obtain more sea urchins when their supply from long-term ties can not fill orders. Harvesters will use long-term ties in order to assure a steady market for their catch, but will opt to go to the spot markets when prices are high, or when they are selling a lower quality product. These are some examples of harvesters and dealers using both trust and price in order to coordinate their exchange relations.

Long-Term Exclusive Exchange Relations

Table 4.1 provides a look at the type of exchange relations that exist between harvesters and coast-side dealers in the sea urchin industry. Using dealer logbooks, the data provide a look at all transactions between harvesters and dealers in the 1996-97 season.[36] The table uses descriptive statistics in order to find variation.[37] Looking at **All**

[36] Logbook data was obtained from the DMR of Maine. In order to assure the anonymity of industry participants, all identifying characteristics of the dealers and harvesters were removed before the DMR supplied this data.

[37] Using the logbooks completed by coast-side dealers provides some insight into the nature of transactions in the industry. Each month every licensed dealer is required to turn in a logbook to the DMR. The logbook should record all transactions in the industry including the date, location, harvester's license number, weight of catch, roe percentage, and price paid per pound. Having a record of all transactions has obvious advantages in this type of research. The data are not without flaws, however. Dealers have been compelled to fill out these logbooks by the DMR. Although landings and costs should accurately reflect their tax records, there is no way to check that a harvester's catch is accurately represented. In

Harvesters, Row 1 examines the *Number of Dealers* a harvester sold to over the course of the season. The first and third quartiles (columns 3 and 4) capture the different types of relations that exist in the industry. The first quartile shows that at least twenty five percent of the harvesters sold exclusively to one buyer over the course of the season.

This form of exchange is similar to that found in other inshore fisheries in the same region. In these fisheries researchers find non-market relations coordinating exchange between inshore harvesters and coast-side dealers. In New England's fresh fish market, Wilson (1980) found long term exchange relations between harvesters and buyers based on norms of reciprocity. The reciprocitive relations benefited both buyers and sellers by decreasing the amount of uncertainty in their business operations. The dealer's business requires a constant supply of reasonable quality fresh fish in order to fill his clients requests. The fisherman's business interest lies in securing a fair price for his catch. Dealers commonly have better information about the current market value of a fisherman's catch, and could use this to take advantage of the harvester. However, the fisherman can always withhold future supply from a buyer who cheats on a deal. The threat holds weight given the buyers need for constant supply.

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fact, it seems likely that a dealer would misrepresent individual harvester information. Similarly, harvesters' transactions are likely to be misrepresented. More than one harvester will often sell their catch under one license number, and harvesters can provide inaccurate license information easily. In the busy atmosphere of the market exact records are often lost. However, for the questions asked here these measurement problems favor the conclusions reached using the data. If more accurate records were kept we would expect the number of buyers used by a harvester to increase, and the percentage of catch going to a primary buyer to decrease. These changes would further highlight the frequent switching that occurs in the industry.

Table 4.1 Logbook Data

	Mean	Median	1st Quartile	3rd Quartile
All Harvesters				
Number of dealers[1]	3	2	1	4
Proportion sold to first dealer[2]	.76	.82	.54	1.0
Number of days fished[3]	20.5	16	4	33
Number of months fished[4]	4	4	2	6
Number of counties[5]	1.4	1	1	2
Exclusive Harvesters				
Number of dealers[1]	1	1	1	1
Proportion sold to first dealer[2]	1.0	1.0	1.0	1.0
Number of days fished[3]	10.4	2	1	13
Number of months fished[4]	2.24	1	1	3
Number of counties[5]	1	1	1	1
Nonexclusive Harvesters				
Number of dealers[1]	4	3	2	5
Proportion sold to first dealer[2]	.63	.63	.48	.81
Number of days fished[3]	25.7	24	11	37
Number of months fished[4]	4.9	5	4	6
Number of counties[5]	1.6	2	1	2

[1]Number of different dealers to which harvester sold landings.
[2]Proportion of harvesters season landings purchased by the buyer that harvester sold to most often.
[3]Number of days fished during the 8 months season.
[4]Number of months in which harvester fished at least once.
[5]Number of counties in which harvester sold landings.

A long-term relationship between buyer and harvester helps solve some of these exchange problems. For the buyer, a long-term relationship helps assure a constant supply. These arrangements allow the buyer some certainty in the quality of fish he will receive, and a reliable source to which he can always turn. The long-term relation assures the harvester a fair market price for his catch. As predicted by Gouldner (1960), Wilson finds that other trust dependent relations develop from these long-term ties. Fishermen get better access to market information, can base equipment upgrades on assured future sales, and can expect fair evaluation of quality and price for their catch. A dealer may pay slightly above market price for fish in order to assure a positive return on the vessel's trip. These steps assure future supply and perhaps gain the buyer some influence on timing of a fisherman's future effort and the species sought.

Strong social ties, kin, and community in the economic process stand out in Acheson's (1988) research on Maine lobstermen. In most small businesses on the coast of Maine, but especially in the lobster fishery, Acheson finds a firm operated by a core of relatives. Few businesses hire more than four employees without close kinship ties. Family employees have a number of benefits, including trust that they will keep business secrets and being able to ask for long hours of work during times of need. In addition, a large number of children and wives perform essential tasks for the operation without pay. Kin form apprenticeship relations to learn skilled jobs and important information can be shared between the trusted relations. These include references for good employees, sources of credit, and information on new business innovations. Families often lend money for new businesses, and it appears that larger numbers of kin involved in a fishing business lead to greater success, also.

Acheson finds long-term reciprocal exchange relationships in the lobster industry as he follows the marketing chain from harvesting to the consumer. Lobsters reach the consumer through a string of exchanges between harvesters, dealers, pounds, wholesale distributors, shippers, and retailers. The primary production problem in the lobster fishery is an uncertain supply and demand. For instance, a dealer must balance a supply of lobsters from fishermen on one side and demand from consumers including restaurants, hotels, and wholesalers on the other. The fisherman harvests an uncertain supply of lobsters each day, but demands payment for their catch on the spot. Consumers make a steady demand for lobsters from the dealer, preferably at a steady price. A dealer may have to buy a fisherman's lobsters for which he does not have a demand. In addition, he may have a larger demand than the fishermen are catching at a particular time.

To balance supply and demand firms develop long-term reciprocal relations (Acheson, 1988:119). Wholesalers know that their dealers will attempt to fill demands during times of scarcity, and the dealer knows the wholesaler will buy as many lobsters as possible during times of overabundance. Firms in the industry know that the other operations they work with will go out of their way to fulfill the informal arrangements to balance supply and demand in a way that is best for both parties. Similarly, harvesters and dealers establish long-term relations that have mutual benefits. The dealer attempts to attach fishermen to his firm to assure a steady supply of lobsters for his customers. In return, the fishermen gets an assured buyer of his catch, and often times supplies such as fuel and bait with little or no mark up.

The long-term exclusive ties found in **Table 4.1** resemble the inshore groundfish and lobster industries described by Wilson and Acheson. Fieldwork and interviews support the interpretation that these exclusive relations resemble the reciprocitive relations found by Acheson and Wilson. A number of harvesters work from local ports, and sell to local buyers exclusively. Below I explore why a form of exchange similar to exiting fisheries developed in this new fishery.

Forming Exclusive Exchange Relations

A set of long-term exclusive relations based on trust, similar to those in other local fisheries, appears to have developed in the new sea urchin industry. Below I consider possible explanations for the development of trusting exchange relations in three parts. First, I consider the possibility that these relations could evolve through the pursuit of rational self-interest of the exchange parties. Second, I examine the problem of indeterminacy in economic exchange. Finally, I look more closely at the actual long-term exchange relations that have developed in the whole/live sector of the industry and attempt to reach some conclusions for the origins of these relations.

The Evolution of Cooperation

Economists have attempted to show that the trust that develops between exchange parties, like those described above, evolves from cooperative relations based on the rational self-interests of parties to a recurring exchange (Axelrod, 1984; Taylor, 1987). **Figure 4.1** maps this process using game theoretic techniques. Here we have two parties to an exchange, a harvester, and a dealer. Each party has the option of cooperation or non-cooperation. A dealer cooperates by offering a consistent market for a harvester's

product at a fair price. A harvester cooperates by agreeing to offer a constant supply of product. The matrix in **Figure 4.1** models the payoff of a decision. Each participant's payoff varies based on the decision of the other party to the exchange.

Dealer	**Harvester**	
	Cooperation	Non-cooperation
Cooperation	Quadrant A 3,3	Quadrant B 1,4
Non-cooperation	Quadrant C 4,1	Quadrant D 2,2

Figure 4.1 Prisoner's Dilemma Model of Bargaining Process

Figure 4.1 follows a classical Prisoner's Dilemma game. Here there are advantages to each party if both cooperate. The payoff increases for a non-cooperator if the other party cooperates. If both parties choose non-cooperation a balance of payoffs occurs, but the payoff is lower for each party than if they had both chosen to cooperate. In this game, a participant prefers non-cooperation if the other party chooses to cooperate. A participant also prefers non-cooperation if the other party chooses not to cooperate. In a one-time exchange between anonymous parties, the outcome of this game is mutual non-cooperation, although cooperation would provide a better payoff to both.

The outcome of mutual non-cooperation results from this game when the exchange is one-time and between anonymous parties. A different outcome may develop when exchange is recurrent. Participants may adopt a conditionally cooperative strategy to the recurrent game[38]. Sometimes known as "Tit for Tat", a party to exchange will

[38] Discussion of the 'Tit for Tat' game can be found in Axelrod (1984), Taylor (1987) and Elster (1989a).

choose to cooperate as long as the other party to the exchange cooperates. In this way participants use previous experience to judge the future strategies of exchange parties. From a strictly rational perspective, the "Tit for Tat" game provides a possible explanation for the evolution of cooperation in inshore fisheries.

There are two problems with this explanation for the development of trust. First, the calculative cooperation described above and trust are not the same thing. In fact, the absence of the calculative motives of the game theory model more accurately characterizes trust. The difference is important, because the cooperation that results from calculative motives is less stable than a cooperation based on norms of trust. In the recurrent game model, participants can disrupt the cooperation easily after one questionable transaction, and participants must evaluate each transaction critically. If a participant blindly cooperates without calculation, it becomes beneficial for the other party to defect regularly. Interestingly, TCE questions the evolution of cooperation argument on similar grounds. The constant calculative actions create transaction specific investments, and are not the most efficient means of coordinating exchange. Trust, as a non-calculative cooperation, succeeds in overcoming these transaction specific costs.

The second problem lies in the game model's assumption of straightforward exchange with full knowledge of outcomes. Harvesters bring a day's catch to dealers in order to exchange it for payment; dealers estimate the value of the harvester's catch to determine a price to pay for the sea urchins. Exchange takes place when a harvester agrees to exchange his catch for the price offered by the dealer. This captures the exchange process at it simplest, but day to day this exchange is fraught with what economists call indeterminacy. Indeterminacy describes a point when insufficient

evidence makes a rational judgement about the likelihood of various outcomes of an action impossible (Elster, 1989b:30-41). In the game models, the participants can not judge the payoff matrix when outcomes are indeterminate. Perhaps an obvious solution to the problem of indeterminacy is to collect more information, but how much information to collect is indeterminate also. Introducing competition and the perishable quality of products to the exchange process increase the urgency of the decision; there are potential costs or advantages to acting too quickly or not quickly enough. These problems can be demonstrated very well looking at the sea urchin industry.

Indeterminacy in the Sea Urchin Industry

Attempting to estimate the value of a sea urchin harvester's catch resembles the indeterminacy described by economists. This can first be seen in the entrepreneur's attempt to estimate the value of the catch on the Japanese market. Sea urchin roe from the Northwest Atlantic is sold in a number of different Japanese markets, but entrepreneurs primarily follow the activity at the Tokyo Seafood Auction to monitor the market for their product. Although this already simplifies the market for his product, there is still considerable uncertainty making this estimate. First, the estimate is a forecast about the market activity in four to five days. Joe Handy makes this forecast in consultation with his Japanese broker:

> We talk about it on the phone. To try to project what the market's gonna be like. Cause I have to know what the market's gonna be 4 days from now, not what it is now. My product's not gonna get there for 4 or 5 days. 5 days actually. If I buy tomorrow, it's gonna be 5 days before my product gets to the market. So, I'm not interested in what the market is today, I'm more interested in what it's gonna be 5 days from now. And that's the hat trick in this business.

For a processor, they have to buy product one day, process it the next, and then transport the product to Japan, a process that can take up to five days. As Handy says, he is not interested in the market today, but in five days. A number of factors go into this forecast. Entrepreneurs have to estimate the strength of demand, the yen to dollar ratio, the amount of product coming from the Northwest Atlantic on the market, and the amount of product from other regions of the world on the market:

> There's so many influences on the market. There's weather conditions in Japan, production from other places [Korea, Russia, Chile], like I told you, does have an influence. It's not a solid influence, but it's still an influence. Some of the big companies might unload a large amount of volume at once. That tends to dry that market up. But these are all things I can not foresee, that nobody can foresee. My competitors aren't gonna tell me what they're shipping. It's kind of a crapshoot. But that's pretty much a typical day.

These circumstances make an accurate estimate of the product on any one day impossible. Working in the market day to day increases knowledge, but many factors remain unknown in assessing value to a harvester's catch. An entrepreneur must make a best guess of value. Since it is better to err low, the dealer's interests lie in securing the product from the harvester at the lowest possible price. Having more market information than the harvesters, dealers will attempt to buy sea urchins well below market value if they can. Harvesters are aware of this:

> So one buyer might be at say 60 cents a lb. for that day, but the guy down the street went up to 85. You know he was paying 85 but the other guy knew about it too, but he, you know. He wouldn't be to quick to try to jump his price and try to get as much as he could before the word got out. "Oh, oh yeah, I'll give you 85 cents!" But the mean time you know, 10 other people or 20 other people went through at 60.

Here the dealer was willing to pay $.85 per pound for the product, but if he could get away with paying $.60 he would. At the fish pier, it is harder for a dealer to restrict market information, but the interest remains.

The value of the product on the Japanese market is not the only point of indeterminacy for the dealer. The value of a harvester's catch also varies based on the quality of the product. As the Northwest Atlantic sea urchin roe more closely resembles the Japanese sea urchin roe, the value increases. In general, the higher quality roe is firm, unbroken, and a bright yellow color (Wilen and Wessells, 1997). On the fish piers dealers measure quality with a roe count—the percentage of the whole urchin weight that comes from the roe weight.

Roe counts vary from under ten percent to over twenty percent. In order to estimate the roe counts of a harvester's catch buyers perform either a formal roe test or an informal crack test. In a formal roe test, the buyer takes a sample of the harvester's catch and weighs that sample. Recording this weight, the buyer then separates the roe from this sample of urchins, weighs the separated roe, and finds the ratio of roe to whole urchin. The roe test also gives the buyer a chance to inspect the color and texture of the catch. The formal roe test can take some time, and when the pier is especially busy, a queue of harvesters can develop waiting for a roe test. Because of the queue, many buyers use a simple crack test. In the crack test, the buyer simply cracks open a few urchins from the catch without removing them from the fisherman's totes. Looking at the cracked urchins the buyer estimates the quality and offers a price.

Both formal and informal methods of estimating quality are flawed measures. Each estimate is surely off by a few percentage points, and at best, the tests can spot a particularly low quality catch. The sample of sea urchins chosen for the test is usually quite small and not random in the statistical sense. This decreases the chances that the sample reflects the whole catch. Estimating the roe count of the sample using the crack

test is obviously prone to errors, but even in the formal roe test, this measure can be off. Rarely is the roe perfectly removed from the urchin; sometimes excess material stays with the roe, and sometimes part of the roe is left behind. In addition, buyers often take some roe out of the second weighing because of discoloration or poor texture changing the roe to whole urchin ratio. When working with a small sample, these minor factors can lead to differences in one or two percentage points in the roe count estimate. Buyers are aware of these problems:

> Every test is at random. You try to take the randomness out of it, by taking a sample out of every tote, through the top, middle, and bottom of every tote. But, really, it's pretty random. So, two tests could come out slightly different.[39]

It is common for buyers to conduct more than one test and find a difference of a few percentage points in the estimates. These few percentage points can have a large effect on the value of the catch given the base price method of setting value.

Prices for sea urchin landings are set on a per pound basis, and base prices are set at a ten percent roe count level of quality. The price is set for a ten percent roe count and then varies by $.10 for each percentage point above or below ten percent. For instance, with a $1.00 base price an eleven- percent roe count would garner $1.10 per pound price. Similarly, a nine percent roe count would garner a $.90 per pound price. When catch sizes approach 1,000 pounds a $.10 or $.20 difference in per pound price can make close to a $200 difference in the value of the catch. Given this method of placing value on the

[39] Here the buyer is clearly not using random in the statistical sense, but in a popular usage meaning haphazard.

catch, slight differences in the estimate of quality can have large consequences for the overall estimate of catch value[40].

[40] In this discussion I attempt to analyze the ways in which uncertainty exists it the exchange process. However, the following extended quote from an interview provides a telling example of this difficulty as one entrepreneur attempts to factor the many uncertain aspects of the exchange in order to approach the exchange rationally. His difficulties alone are very telling, and provide some foreshadowing to later arguments:

> I'm watching the yen, everyday I watch the yen, and the yen has gone in the past week and a half, it's gone form 120 yen to the US dollar to 126. So, that's one thing that's going on. It could be independent of the urchin price, but we have our eye on that. Something's happening, and there's lots of reasons, but anyway, the price is falling in Japan. The trade price, so we're talking in... So today, it would seem like it was a simple spreadsheet to calculate that every day, but it's not. It's actually very calculated because you're buying from 9% up to 20% yield. And basically you start off with a base price of say, 10%. That's where you base everything, 10% yield. So, say we say today the base price is...this morning we said it went down to 50 cents a pound at 10% yield. Which is a very low price. Think of a high price for a pound of sea urchins, they're heavy things. You can say 5 sea urchins. But, anyway, that's a very low price. That would mean that if they brought in sea urchins of 11%, it would be 60 cents a pound. It goes up a dime, ten cents, every percentage. Or reversibly, it goes down ten cents every percentage below. But, we don't buy below 9% because it's not big enough to work with. Yeah. So, and what you find is that for these yields, when you work it out with 10 cents going up and 10 cents going down over these yields, you can then calculate how much the roe is costing. What's the true cost of the roe in every day trading? You may say every 100 grams costs. What you find, take any percent, say we take 10% yield, and we look at the base price for that of, say 70 cents. There's a weird reversal happens. 70 cents is actually the price where no matter what yield you take, if you took 9, 10, 11, any yield, you would always have the same cost for the roe. Because the price is rising or falling with the yield and the amount of roe that gets extracted compensates for the price. So, you end up, whether you're buying 15% or 9%, it's the same price all the way through, 70 cents.
>
> Oh, really?
>
> At 80 cents, the lower yield is more expensive because you're taking less out, so that the roe... so then your motive is for buying, when you get over 70 cents you would like to buy higher yields. It's more economic. Lower cost, too, to take it and put it in the trays. Below 70 cents, it's the opposite.
>
> Right, your margins decrease...
>
> You're motivated to buy lower yield. Cause that's where its... and I just discovered that recently on a spread sheet. I thought that was a pretty exciting thing to find. It was weird, I couldn't believe it. I was looking at the figures, and then boom! But that makes everything else very complicated. Because when you take that little picture and you plug that into the larger picture of cost analysis and everything and market price, you've got this stupid reversal happening, it really blows your mind away some times. And you have to be very aware of that because you think you made a mistake, and then you suddenly realize it's reversed and these answers are so real. And that's one thing I've identified, but it still doesn't pay to buy yield. Because, although the cost of roe is cheaper, there's less units of product to sell. So, of course, you make a margin on the

Long-term Exchange in the Whole-Live Market

Harvesters and dealers working in the whole-live market operate under similar circumstances as the lobster and groundfish industries. With indeterminacy, uncertain supply and demand for the dealer, and insufficient market information for the harvester lead to long-term relations in this sector of the industry. The whole/live market serves an elite customer in Japan; the demand is smaller than that for the processed market, but consistent. The whole/live entrepreneurs need a high quality product, but consistently pay higher prices also. Under these conditions, long-term exclusive relations based on reciprocity have developed between buyers and sellers. These buyers rely on a stable supply of high quality sea urchins from harvesters. In order to assure this they have made accommodations to their loyal harvesters. Robert Thompson requires a day to evaluate

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> cost of roe, but you also make a margin on every product, item, unit. So, even though, when it's below 70 cents, it's more economic in cost of product in each package to buy lower yields, overall, it's still more economic to buy higher yields, because you get more product to sell. It overcompensates for the cost. So, I think that's a very interesting thing I've discovered recently.
>
> So, imagine you're out on the pier, do you run through those things in your mind when you're buying?
>
> No, it's much more complex over there, because over there you've got a very, very competitive market situation, auctions. You have an old boat comes in, you have 5, 6, 7 buyers all climb down at the same time. Then, they do what you call a stomp test, crack them open, and then they all start calling out prices. It's very risky, it's buyer beware. Same time as that's going on the divers, some divers, a few of them, are trying to, what they call, "sugar their totes." Yesterday was what they call "peanut butter sandwich" which is when the put high yield on the top, high yield on the bottom, and then bad product in the middle. Because they know that we stomp the top to look at them. And then we knew we were being, they were "sugaring" before they were being good on top and just bad on the bottom, so we were turning the totes over or we were looking at the bottom of the totes. And every year you find 2 or 3 buyers who are knew buyers, quiet often they are Cambodians, and for one reason or another, they seem to be higher. Their prices are way higher. And that really throws a spin on the works, in to the whole buying situation. The whole auction, you have these people up there that don't have any relation to the market. People talk about money laundering and all sorts of things, but who knows what that's all about. It could just be that these people will be out of business at the end of the season, because they lose a lot of money. So, there's that, that complicates, the whole market.

the catch of a harvester before making payment, in effect a consignment type relationship. He feels his quality market requires he does this, but he is willing to accommodate the harvesters with a steady market and a fair price:

> It's a little bit hard for me buying on an every day basis, but I manage to do it, just because you pretty much have to. If you buy from the guys every other day, they're not gonna stay with you... For the most part, they're pretty loyal. Just treat them right. I treat them right, believe me. I can afford to pay them a little more for that ability to look at them first. Because they figure, they're gonna get a fair price and they're gonna get a fair deal.

There is some risk involved for the harvester, but Thompson attempts to compensate the risk by offering a little more money for the product than most dealers offer. A trust develops between the exchange partners and they begin to integrate their activities closely; buyer and seller coordinate their productive activities:

> That's part of the communication process and you only have to get a hold of the divers that night or early the next morning. Usually they call into the plant now. We go into pack at like 2 and 3 in the morning, and when they get up, they call in; can we go today, or what price did you get yesterday, and can we go today, and that type of thing. It has to be pretty under control.

Though technically separate, harvesters and dealers work closely with one another, coordinating activities and accommodating each other's needs in the productive process.

Similar to Wilson's findings, these long-term relations often develop other reciprocitive characteristics. Holtz is a whole/live entrepreneur who insists on loyalty in the harvesters from which he buys. Similar to Thompson he has a small, consistent market for a quality product. He does not have any hard feelings if harvesters would rather shop around, but he does not want to deal with that in his business. In return, he provides his divers with additional services like filling their air tanks each night or sending a truck to pick up their urchins when they cannot come to his wharf. The

harvesters appreciate this and agree to be loyal in the relationship. Nick Sage doesn't see any reason not to:

> There are people who will try to bounce from him to whoever's paying the most on a particular day. He doesn't put up with that. All of his boats are full time boats for him. I have to deal with him all the time, so, as far as I'm concerned, it's not worth screwing up that relationship. It's very convenient with Harvey. He fills the tanks; he's competitive [with price], if not higher than anyone else.

The harvesters and buyers that work in the whole/live market develop long-term relations embodied with reciprocity and trust. The trust helps to make economic exchange smooth and harmonious, reducing transaction costs. However, if not an evolution from calculative cooperation, where do these relations come from? TCE seems to explain their existence with their success, but some clues to their origins may exist in sociological perspectives.

Perhaps these relationships develop through mimetic imitation of other fisheries. Mimetic processes often lead to isomorphic occurrences, and Fligstein proposes that new industries adopt guiding conceptions from industries that are close by (1996:665). The harvesters and dealers in the whole-live market are aware of practices in the lobster and other fisheries and are sometimes admiring of participants in them, but evidence of actual imitation is hard to find.

There is evidence of normative pressures influencing the establishment of long-term exclusive ties. Economic actors carry normative expectations with them when they move from one economic context to another. In previous chapters, we have seen these pressures create inertia among actors, and their eventual dropping from this new fishery. In other cases, these participants have remained in the industry and they carry conceptions of the rules of exchange between buyers and sellers from one industry to

another. Harvesters and buyers with experience in other fisheries that utilize long term exclusive relations based on reciprocity and trust maintain these conceptions of the rules of exchange and attempt to establish similar relations in the new sea urchin industry. This is the case for Chuck Anderson, who came to the sea urchin fishery from lobsters and would like to maintain similar relations with buyers in the sea urchin industry:

> I've always been the type of person; I only sell to one person. I didn't want to spread around very much. I don't like to. I like to be able to come in, unload, and get whatever it's worth. I'd rather have somebody that buys all the time and you can be loyal.

Drew Taylor, also coming from the lobster industry, feels similarly. His interest in working with one buyer is rooted in his position as a fisherman in the waterfront community:

> I like to keep the business going in the local wharves if I can, because it just makes sense to help people around the community. A lot of the time these guys will jump back and forth because one buyer will want them worse one day and he'll pay a dime more. I can't keep track so I stick with one and figure it levels out. Course I try to keep the quality of my urchins right. You've got a lot of guys that try to sneak things through. Line the bad urchins with good. I try to keep it honest and it usually pays off.

Rather than a calculative cooperation, Taylor appears to prefer the long-term relation as a way to avoid the calculative action. Taylor chooses to sell exclusively to his dealer out of a commitment to the local dealer's wellbeing. The loyalty appears to come from the shared commitment to the community, but there is also a practical aspect to the decision. He believes he is saving time and energy with long-term exclusive relations. In TCE terms, long-term exclusive ties reduce transaction costs.

It is difficult to differentiate the effects of TCE economizing and institutional pressures in the instances of exchange relations similar to those of other inshore fisheries. Perhaps the more compelling explanation comes from the TCE perspective. These ties

result, it appears, from the conditions of exchange within which the parties are working. Similar to the lobster and groundfish industries, dealers need a steady supply of a quality product, and the harvesters need a reliable market and a fair price. The demand for this product is stable and there is little competition between these entrepreneurs. The lack of competition between buyers and the balance of interests found between the exchange parties result in the reciprocitive, long-term, exclusive relations of the whole/live sea urchin market. However, it is difficult to rule out the role of normative and mimetic pressures. Looking more closely at nonexclusive exchange relations in the sea urchin industry allows further consideration of these questions.

Nonexclusive Exchange Relations

A look back at **Table 4.1** shows that the exclusive relations discussed above do not dominate the sea urchin industry. Considering Row 1 again, harvesters sold to a mean of three buyers during the season. The median and third quartile show that over 50% of harvesters sell to at least two buyers, and over 25% sell to three or more buyers. Although these harvesters sell to more than one buyer, there still remains the possibility that second and third buyers make up a small amount of the actual exchanges the harvester makes over the season. Stated another way, each harvester may have a primary dealer to whom they sell their catch. This primary dealer may buy nearly all of the harvester's catch, indicating a strong commitment between exchange partners if not strict exclusivity. Row 2 under **All Harvesters** examines the proportion of a harvester's total landings sold to their primary dealer. It shows that harvesters sell a mean of 76% of their catch to a primary dealer, and a median of 82%. Although this does portray some commitment to a primary buyer among harvesters, it does not appear consistent with the

reciprocitive relations found by Wilson and Acheson. Looking further at **Nonexclusive Harvesters,** Rows 1 through 5 examine those harvesters who sold to at least two dealers over the course of the season. These harvesters sold to a mean of 4 different dealers, and 25% of this group sold to five or more dealers in the season. These harvesters do not show much commitment to a primary dealer, selling an average of 63% of their catch to a primary dealer. The first quartile shows that one-quarter sell less than half of their catch to a primary dealer. Of this lower quarter, perhaps we can say they have no primary dealer.

Figure 4.2 provides a graphical illustration of this phenomena. It plots the proportion of a harvester's catch sold to the primary buyer by the number of buyers to which the harvester sold. In the top left of the graph, we see the long-term exclusive relations that resemble the reciprocitive relations found by Wilson and Acheson. Here harvesters sell 100% of their catch to one buyer. However, as we look down and to the right, the graph shows harvesters who are selling only a fraction of their catch to a primary dealer. These harvesters divide their remaining catch among a second, third, and in some cases over ten other buyers. The cases found in the upper left-hand corner of the graph appear consistent with the findings of Acheson and Wilson. However, it is the large number of cases that are not clustered in that corner, culminating in spot markets that develop at public piers that distinguish the sea urchin industry and beg further examination.

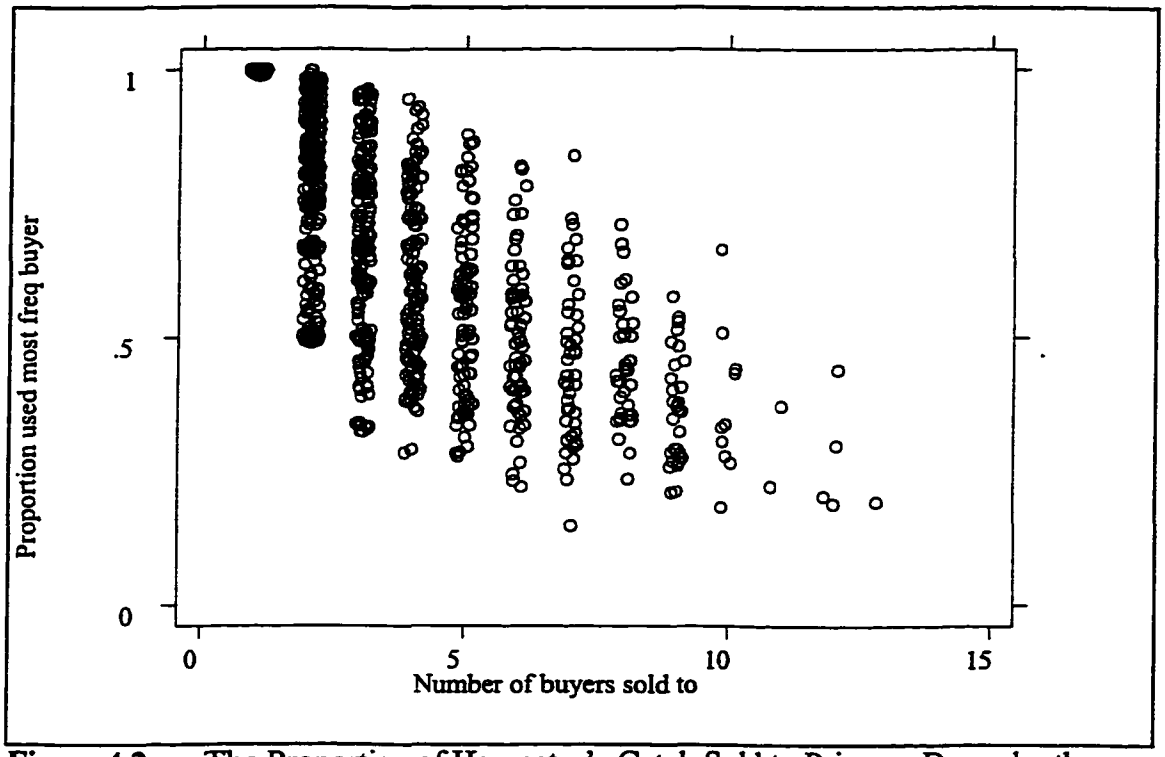

Figure 4.2 The Proportion of Harvester's Catch Sold to Primary Buyer by the Number of Buyers Used

Rather than an instance of isomorphism, these nonexclusive relations depart from the form of exchange found in other inshore fisheries discussed. One explanation may be that exchange in this new fishery takes place under different circumstances. We have already seen that a considerable amount of indeterminacy exists in the exchange. Below I further examine the affects of opportunism and competition on exchange in the sea urchin industry.

Competition and the Public Pier

Perhaps the most noticeable difference between these nonexclusive relations in the sea urchin industry and the long-term relations discussed above is the extent of competition between dealers and the ability of harvesters to obtain multiple bids on their catch. This is most apparent at a set of spot markets that have developed at public piers

along the coast. Previously, local buyers held near monopoly status by controlling access to the waterfront. As Wilson states, the private ownership of offloading facilities by individual first buyers and the time involved with moving from wharf to wharf strongly discourages the possibility of harvesters soliciting multiple bids for their product (1980:493). At the spot markets fishermen easily obtain multiple bids for their product. Below I examine the development of the spot markets in the sea urchin industry at public fish piers.

Interestingly, the impetus for the public fish piers in Maine came in 1979 during the period of growth in the groundfish industry. As many others have observed, a period of growth followed the implementation of the 200-mile limit a part of the Fisheries Management Act and both Federal and State governments were optimistic about the development possibilities of the commercial fishing industries[41]. In Maine, Governor Joseph Brennan considered the fishing industries the cornerstone of the Maine's economy. Primary among Brennan's goals was maximizing the value added to fish products in Maine[42]. To reach the goals Brennan wanted to increase instate processing and establishing groundfish auctions in Maine. Establishing modern fish piers along the coast was a key part of this initiative.

Funding for the piers came from a variety of sources. Brennan negotiated with representatives of the Commerce Department, receiving $10 million for improvements to the commercial fishing industries. The Commerce Department allocated the money contingent on the passage of a $11.8 million bond issue accepted by Maine residents in a popular vote that year. The majority of the funds went to the Portland Fish Pier, and the

[41] See Dewar (1983) Dorienger, et al. (1986).

State divided remaining funds between piers located in Kennebunkport, Rockland, Saco, Vinylhaven, Stonnington, and Eastport. The funding for the piers came from state and federal funds; the piers are built on public property owned by the local communities; and the management of the piers varies from port to port with the local community taking primary responsibility for day to day operation.

The Portland Fish Pier went on to establish the Fish Exchange, a successful auction for groundfish. For other piers success did not come so easy, and their linking with the sea urchin industry developed through the coincidence of their mutual developments. When Brennan and the local communities planned the development of the fish piers, they had the groundfish industry in mind; no one foresaw a sea urchin fishery. Surprisingly, the groundfish industry in Maine did not grow as some predicted, and the sea urchin industry became key to the pier's success. Today the sea urchin industry is the primary activity at the Rockland and Stonnington piers from early fall through the winter, providing half of the pier's revenues.

The paths crossed partly because of the competitive strategies employed by entrepreneurs working in the processing sector of the sea urchin industry. First, the business group entrepreneurs' competitive strategy included setting up buying stations in a variety of areas along the coast. They often chose areas in order to be competitive in with other expansion-oriented entrepreneurs, resulting in a concentration of buyers in a local area. Often the business group entrepreneurs would establish relationships with established inshore buyers in these areas. However, as we saw in Chapter 1, the institutional pressures on these established inshore buyers often lead them to drop out of

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[42] Gov. Brennan outlined his goals for the future of Maine's commercial fisheries in a speech given at the March, 1979 Maine Fishermen's Forum.

the sea urchin industry. This lead to turnover in the buying sector and raised the problem of waterfront access for the business group entrepreneurs. At this time, the public fish piers were struggling to stay above water. When Bret Storm took over management of a mid-coast Fish Pier, it was all but closed:

> The guy that had it before me, he paid the city $4,300 out of the 5 years he had it. Basically, he closed the pier down. The month of October [1997], I paid the city five grand.

Storm was now paying the city as much in a month as the previous pier manager did in five years. He was able to turn the pier around in large part due to the revenue from the sea urchin industry.

Storm runs the pier as a business independent of the city, paying the city a proportion of his total revenue each month as a lease. Revenue is collected on all products that cross over the pier. Lobsters garner $.03 per pound, urchins $.05 per pound for instance. There were no sea urchins crossing the pier when Storm started to manage the pier. However, in 1992 he started a relationship with Jack Chan, a business group entrepreneur from Portland. Chan was looking for a buying station location in the mid-coast region, and Storm saw some potential in the relationship. Preparing the pier for the sea urchin buyer took some investment in the infrastructure from Strom:

> I started it. I mean, I shouldn't take the credit for it. It would have started if I'd been here or not, but I happened to see the potential in it and put in all the buildings, we needed the hoist, and loading docks... So, I put them all in.

Given the competitive strategies of the business group entrepreneurs, Storm was soon flooded with dealers interested in working from the pier:

> It turned very quickly. Each year we just added on another, another, and another. It was the first time I've ever been wined and dined. People would call you up from different companies and say, Can we have a meeting.

Storm was not aware of the competitive processes going on with the business group entrepreneurs, and the demand for spots on the pier surprised him. However, knowing these strategies it is not surprising that demand for a position on the pier increased so quickly. Perhaps it also is not surprising that the close competition between buyers became very heated. The early years at this mid-coast Fish Pier are popularly known as "The Urchin Wars". Buyers competed fiercely for harvester's daily catch first through price, and occasionally through violence and sabotage.[43] The competition benefited harvesters, increasing the price paid for their catch.

With the concentration of buyers at the pier, and the rise in price due to the competition, the number of harvesters coming to the pier increased also. For this reason, the pier became the natural starting point for a new buyer wanting to break into the industry. When the transient entrepreneurs, employing the competitive strategy of traveling to coastal areas and offering cash for the product, began moving into the industry, the fish piers were an obvious place to start. The initial concentration of buyers increased the concentration of harvesters and the potential for buying sea urchins on any given day. The transients were attracted to the public fish piers, and their presence further increased the density of competition.

The independent growth of the sea urchin industry, and the public investment in building fish piers coincided. This resulted in the spot markets in the sea urchin industry, and increased the ability of harvesters to obtain multiple bids on their product. However, it might not be so easy to explain the frequent switching with the concentration of competition at the public piers. In areas without public piers harvesters will go to

[43] Many industry participants can share stories of slashed tires and fist fights between rival buyers during this time.

extreme lengths in order to solicit multiple bids on their catch. Harvesters will land their catch and drive as far as an hour in search of what they consider a fair price. In Washington County, harvesters will drive between Jonesport, Milbridge, and Winter Harbor in order to get bids and compare dealer offers. Between driving to different dealers, waiting for a bid, and then evaluating the multiple bids a harvester can add three to four hours to their day in the transaction process alone. These are exactly the conditions that Wilson believed would limit competition between dealers in the groundfish industry and the transaction specific investments Williamson discusses. However, in the sea urchin industry many harvesters go to extreme lengths to receive multiple bids on their product.

The harvesters appear to take these extreme measures based on a general distrust of the dealers in the sea urchin industry. One harvester states this very strongly:

> Whoever the man with the best price was the one who got the product. They're all thieves...The only thing slipperier than a fish is its dealer. Yeah, they're thieves. They'd figure in a wet weight versus a dry weight. When they'd cull them out, they would knock off a lot of the ones that were healthy. When they'd measure up the roe count, they'd give you a lower percentage than what you should have. It's just a scam. It's a scam.

In contrast to the harvesters involved in long-term exclusive ties, there is little potential for trusting a dealer among these harvesters. Looking for multiple bids is a way for these harvesters to counter the exploitative strategies of the dealers:

> I tried different places. If I didn't like the way they operated or I didn't like them for whatever reason, I'd just go elsewhere. That's always been the main thing, even to this day. You can try to get someone who's somewhat legit and work with them until they prove you otherwise.

This harvester is being deliberately calculative in his exchange relations with dealers in contrast to the trust-based relations discussed previously. We can further see this distrust between harvesters and dealers when we look at opportunism in the exchange process.

Sea Urchin Industry Opportunism

Although the actual value of a harvester's catch is uncertain, the exchange on the fish pier is immediate and so the estimates of value have immediate consequences for both harvester and dealer. When harvester and dealer do not have a long-term trust based relation the estimate of value becomes a struggle of interests, each trying to alter the estimate in their favor. Harvesters want to get the highest price they can for their catch while dealers want to pay as low a price as they can for the catch. One dealer, who previously worked as a harvester, is open about this struggle:

> When I was selling my urchins to other buyers, I'd crack them open and always pick out the best one, look how good these are. You know what I mean. You throw the bad ones. Now that I'm a buyer, I'm cracking them open and covering up the real good ones.

At each exchange the harvester can maximizes his utility by attempting to increase the estimate of quality, and the dealer can maximize utility by attempting to decrease the estimate of quality. Harvesters use a number of techniques to trick the dealers into overestimating the quality of their catch. The most common strategy is "salting", "sugaring", or "floating" fish trays. During a typical fishing day, a harvester collects sea urchins of varying quality. Harvesters will do a crack test themselves on the boat before coming into the pier and estimate the quality of the sea urchins themselves. After reaching some conclusions about the quality, many harvesters will sort their catch in order to trick the dealers. Salting involves lining the bottom of a fish tray with lower quality urchins and putting a higher quality on top. If the dealer samples only the top of the trays, the harvester will get a much higher estimate for the catch.

Clearly, a dealer only needs to be tricked once in order to know that harvesters may attempt to pass salted trays. Consequently, many dealers will flip a full fish tray into

an empty and check the quality of urchins on the bottom layer. Perhaps predictable but surprising in its guile, harvesters will try to pass "peanut butter sandwiches" also. Knowing the dealer may check the bottom layer of the tray, harvesters will use three layers: good product on the top and bottom, and low quality product in the middle. Although the latter method is extreme, doctoring of trays by harvesters in order to increase the quality estimate is prevalent. The time invested in this process cannot be underestimated either. Doctoring trays can take considerable time for the harvester while headed into the pier. Once at the pier, the testing process itself takes time. Having to look for doctored trays of any kind adds effort for the dealer and time waiting for the harvester. Harvesters collect from ten to twenty trays a day each weighing from 60 to 75 pounds. Having to scrutinize some or all of these trays can add considerable time to the testing process:

> You have to wait a half hour to get in there, cause they got 5 more boats they got to unload before you. Takes an hour to get everybody to look at your eggs. Then it will take at least another hour to get out.

Even at the public fish pier, where dealers cluster, getting multiple bids can add over two hours to the day devoted to the transaction process.

For the buyers, overestimating can mean a considerable loss. In order to decrease the chances of paying more than the value of the catch, buyers often set base prices below their estimates of market value. A lower base price acts to balance the likely overestimate of catch quality. These dealers had a day where they consistently overestimated the quality of harvesters' catches:

> We've been buying what was supposed to go 14% and over 70 % grade A color, and it's not. So, we've just made a big loss because we paid the highest price for that, and then it's not. So, we can't send it to the processor. And we have a low market return for it. Basically, we lose money.

After talking with their Japanese customer, this dealer decided to set a base price below the estimated market value in order to compensate for the loss and other overestimates. They spent time evaluating their estimating methods to try to avoid the problem in the future, and the low base price helps further create a cushion of safety for the dealer.

Looking back at the relations between harvesters and dealers in the lobster and groundfish industries, these relations in the sea urchin industry are unusual. The buyers and sellers have similar interests as those in other fisheries: harvesters are looking for a fair price for their catch buyers are looking for a steady supply of quality product. Without the institutionalization of long-term exclusive exchange relationships exchange in the sea urchin industry is open to opportunistic behaviors. Each party to the exchange tries to take advantage of the other in order to maximize their utility. The opportunistic behavior on both parts leads to large time expenditures for both, and frequently one of the parties loses out to the guile of the other.

Calculated Non-Cooperation

Why don't these harvesters and dealers cooperate? Curiously, the calculative motives not found in the long-term relations guide these exchange relationships. The exchange is still fraught with indeterminacy as discussed earlier. Simon (1982,1976) proposes that actors attempt to make rational decisions, although indeterminacy limits their ability.[44] It is just this point at which non-market institutions form, according to TCE. However, in these non-exclusive relations the calculating motivations persist. This makes it possible to consider the bargaining process using the game theoretic models associated with the evolution of cooperation argument discussed above. **Figure 4.3**

models the exchange process described above. In this model I attempt to map the recurrent exchange relationship, so one option is to regularly cooperate without using guile and the other to regular non-cooperation with guile. The payoff matrix is the same as we saw in **Figure 4.1**. Here regular cooperation can occur in the "Tit for Tat" form. However, if one party's regular cooperation can be assured, the other party's best interest is to cheat. Therefore, this situation can very easily end in regular non-cooperation.

Dealer	**Harvester**	
	Constant Cooperation	Constant Non-cooperation
Constant Cooperation	Quadrant A 3,3	Quadrant B 1,4
Constant Non-cooperation	Quadrant C 4,1	Quadrant D 2,2

Figure 4.3 Prisoner's Dilemma Model of Bargaining Process under Repeated Exchange

It appears that many of the harvesters and dealers in the sea urchin industry are unable to develop the trust required for cooperation. Instead, they find themselves constantly calculating, unable to be assured of the other's fair play. In effect, their motives follow a Prisoner's Dilemma game and they choose a strategy that does not result in the highest utility, but is the best strategy given the circumstances. It is important to recall that there is still a considerable indeterminacy in this exchange. The actual value of the catch is not within the reach of either harvester or dealer. Just as the formation of long-term ties can be seen as an adjustment to the problem of

[44] Simon calls this satisficing or bounded-rationality. See Elster (1989a:35-6) for a discussion of this mechanism.

indeterminacy, the calculated non-cooperation involved here is also an adjustment to the indeterminacy.

There is a problem with the interpretation above, however. **Figure 4.3** does not take into consideration the transaction costs or benefits of reciprocity that form an important part of our analysis so far. **Figure 4.4** attempts to include transaction costs and the benefits of reciprocity in the model of the bargaining process. Here there are "extra" benefits to being part of a long-term trust based relationship. We have seen these in the discussion of the lobster, groundfish, and some relations in the sea urchin industry. In addition, there are costs, or transaction specific investments, to guarding against non-cooperation. The model in **Figure 4.4** follows what game theorists call an Assurance game. Unlike the Prisoner's Dilemma cooperation should not be difficult to achieve given that there are no increased benefits from non-cooperation. If each player is sure of the others cooperation, each reaches the maximum utility.

Dealer	**Harvester**	
	Self-Interested	Self Interested w/Guile
Self Interested	Quadrant A 4,4	Quadrant B 1,3
Self Interested w/Guile	Quadrant C 3,1	Quadrant D 1,1

Figure 4.4 The Bargaining Process with Transaction Costs under Repeated Exchange

The outcomes of exchange in the sea urchin industry are fraught with indeterminacy. One outcome of the indeterminacy may be the formation of non-market institutions in order to facilitate exchange. In these non-exclusive exchange relations, it

appears that, under indeterminate conditions, harvesters and dealers have attempted to make rational decisions in the bargaining process.[45] **Figure 4.3** provides one possible model for that bargaining process and this model can explain the pervasive distrust and guile found in these exchange relations. However, if **Figure 4.4** accurately models the exchange, by including the benefits of reciprocity and the costs of transaction specific investments, the pervasive distrust and guile no longer can be explained as a result of the bargaining process. Even when it would benefit both parties, the distrust between harvesters and dealers keeps them from following a mutually preferred strategy. Below I consider the social origins of this distrust.

The Dissolution of Trust

Following TCE, we would expect some non-market institutions, like those in other fisheries, to form in the sea urchin industry. Many actors in the sea urchin industry appear to approach their exchange in a constantly calculating manner instead. Even under this calculative bargaining it seems likely that some form of calculated cooperation would develop. However, the spot markets and frequent switching of transaction partners in the sea urchin industry persist. The existence and persistence of this form of exchange rife with deceit and guile seems particularly unusual given the important role of trust in production on the working waterfront. Below I examine the dissolution of trust in the sea urchin industry and the impediments to producing trust based exchange relations. This analysis takes a step away from the economic approach considered above and toward sociological approaches to studying trust. The sociological approach considers social factors paramount to the establishment and maintenance of trust.

[45] Elster (1989b:36) suggests that one reaction to indeterminate situations may be to deny indeterminacy

Zucker described two informal forms of trust in her study of the US economic structure from 1840 to 1920 - process based trust, and characteristic based trust (1986:60-1). Process based trust is tied to a record of prior exchange or future expectations. Typically, it is tied to specific persons, such as a reputation. Characteristic based trust is based on social similarity assumed to accompany social characteristics, such as ethnicity. Here persons assume that those with similar characteristics share similar background expectations that smooth negotiations. Similar to the period 1840-1920 in the US, process based trust on the working waterfront was disrupted by the introduction of the sea urchin industry and was not reestablished in this industry. Trust was disrupted by the introduction of cultural heterogeneity, early violations of trust that have become part of the industry lore, and the instability of dealers and processing firms.

The Disruption of Trust

In previous chapters we have seen how the trust found on the working waterfront provided the flexible adaptation of labor to the new fishery, and enabled entrepreneurs to mobilize labor when initiating their ties with Japanese customers. The trust found on the working waterfront has both process and characteristic based qualities. It is hard to distinguish the economic and community relationships on the waterfront. Exchanges take place between kin, between families that have worked together for years, and between friends and neighbors. These relations are based on process, as well as shared beliefs and expectations from fellow community members. The traditional entrepreneurs and harvesters on the working waterfront held these trust-based relations and used them to start the sea urchin fishery easily. The development of the sea urchin industry attracted

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and attempt to act purely rational based on insufficient information.

the business group entrepreneurs, transient entrepreneurs, young fishermen, and non-traditional fishermen to the industry. The increased participation from outside the waterfront led to a culturally heterogeneous industry. The entry of new participants to the industry disrupted the process-based relations that already existed on the waterfront. A characteristic based trust might help to reestablish trust by signaling shared background expectations among economic actors, but the cultural heterogeneity of the sea urchin industry did not signal those shared expectations.

The industry grew rapidly, new entrepreneurs and harvesters moved into the industry and many established harvesters and entrepreneurs dropped out. The trust that initially allowed cooperative relations to develop easily was disrupted, and three factors acted to impede the reestablishment of trust in the sea urchin industry: the lore of distrustful dealers, the ethnic difference of the transient entrepreneurs, and the regular turnover in the dealer sector.

The Lore of Distrustful Dealers

Rather than a reputation for operating with the trust characteristic of many waterfront relationships, the new entrepreneurs quickly developed a reputation for taking advantage of harvesters. Most harvesters can relate a story from their own experience, or the experience of a harvester they know well, about an early dealer cheating them. In the stories, dealers took advantage of harvesters by withholding market information, or took advantage of the consignment exchange prevalent at the time. Take this example of an out of state entrepreneur coming to a port to buy sea urchins:

> He come to town shortly thereafter and moved over to this wharf next door here, when there was nothing really going on. They come into the wharf, and they was offering 15, 20 cents a pound. He'd fill 2 tractor trailer loads right to the back doors for 15, 20, 25 cents a pound and go

> with them. He'd take them down to Portland or straight down to New York, they'd crack them, and they was making a gold mine.

This is a common story about the low prices that dealers offered in the early years. There was never a market for sea urchins before this, so harvesters were satisfied to get fifteen cents a pound. As the industry developed prices rose to $1.00/pound and higher. Looking back, the harvesters believe they were taken for a ride. Similarly, in these early days harvesters would often exchange their catch on consignment. In a consignment exchange harvesters give their catch over to the dealer before receiving an offer. The dealer evaluates the value of the catch at a later time and pays the harvester accordingly. Wilson (1980) has pointed out that the consignment relationship provides and advantage to the dealer since the harvester has to give up possession of the catch, and is not present at the time of evaluation. According to harvesters, the dealers took advantage of these consignment relations:

> It was easier for processors to, if they made a mistake this week and lost some money it seemed like it was kind of easy for them to make it up next week on you or someone else. It was pretty much, when you put them on the truck and they left your sight, you had no idea if you were gonna get paid for them, if you weren't gonna get paid for them. All you would get was a verbal response from who you sold them too saying, well, those were no good and they were rejected.

> For the first 2 years you had no idea whether you were gonna make money until you actually got the check in your hand. No, not even, the check in hand. Until you actually cashed that check at his bank, so they wouldn't take it out of your checking account if it bounced. For the first 2 years I'd say, I was never sure of my money until it was cash in my hand. And the other times, knowing checks were gonna bounce and trying to beat the call to his bank to get whatever money was in there. That happened to a lot of people.

Although a few of the early dealers garnered this reputation, many of the stories involve Nicholas Cummings, "The Urchin King." Cummings, and his reputation for getting rich by cheating harvesters is an important part of the lore of the industry:

> A friend of mine took our urchins to someone called the "Urchin King" and we got it in just ahead of a blizzard. We got a call that night, while the blizzard was going on. "They were junk and you can come and get them if you want." You know right there in the blizzard was going on. So, we didn't get anything for them. He said, "Well I'll just throw them back." But, we didn't know, and he knew we were pretty new. So, he got over 1000 pounds for nothing.
>
> Nicholas was Darth Vader they called him. They hated him. My son worked for him. He has on his wall, to this day, all the bad checks that Nicholas stuck on him. But he controlled the Portland waterfront, basically, for urchins, so he had to deal with him.

These stories involve the early dealers taking advantage of harvesters who either had no choice in the matter, or did not know better at the time. It is not necessarily important whether these stories involving Cummings and the early dealers are true. What is important is that they are part of every harvester's memory of the early days of the industry. The memory of these experiences, either lived or lore, persist and contribute to the belief that trusting dealers is akin to being cheated.

Ethnic Differences of Transient Dealers

Further contributing to the difficulty of reestablishing trust in the industry is the ethnicity of many of the new transient entrepreneurs. Rather than signal a similarity associated with shared background expectations, these Cambodian and Vietnamese entrepreneurs make trust difficult. Although there are a number of small Cambodian and Vietnamese dealers that travel to waterfront ports along the coast, harvesters appear to consider them as a single group; often referred to as *the* Cambodians:

> Mostly now, it's just the Cambodians. I don't like the Cambodians. They're on the pier; it's mostly Cambodians.
>
> Like with the Cambodians, you come in one day with good urchins, he'll be right down aboard your boat the next day. The Cambodians offered a buck-fifteen.

The Cambodian and Vietnamese dealers are clearly different in look and speech. It appears that harvesters assume a similarity among these transient buyers, and a difference between the Cambodians and themselves:

> We got to watch them down at the pier the other day. They were sitting there fishing, catching these little harbor balls. They was right in heaven. They was filling up a bucket, "oh very good, oh yeah, yeah." They eat anything.

This cultural distance, and the heterogeneity of the industry leads to in many cases a wariness, and in some cases hatred. As one harvester said, "They are Gooks, and I can call them that because I was in Vietnam." When the transient dealers came to the piers to buy sea urchins they were initially turned away. No harvester was willing to take a check from them. They soon adapted a strategy of paying in cash, and paying high prices for the urchins in order to break into the business.[46] In many cases, the aggressive strategy of the transient buyers led to the auction like exchange at the public fish piers.

Turnover in the Dealer Sector

Further impeding the reestablishment of process based trust in the sea urchin industry is the instability of firms in the processing sector. Looking back at **Table I.1** shows the amount of turnover in the industry from year to year in this sector. In Chapter 2, we saw that much of this turnover resulted from the increased density of competition in the processing sector. With regular turnover in this sector, it is difficult for trust based on past and future exchanges to develop.

[46] Paying in cash is like retreating to an institutional form of trust, as described by Zucker (1986). Cash currency does not rely on process or characteristic. Instead, the trust in cash is tied to the state's enforcement.

Using Plural Forms of Exchange

The two forms of exchange described so far, relations based on trust and relations coordinated by price and self-interest with guile, might seem mutually exclusive exchange options. However, many harvesters and dealers manage to use both forms of exchange strategically in their economic relationships. Let's look back at the logbook data, to examine this possibility further. In **Table 4.1**, Row 2 under **Nonexclusive Harvesters** shows that at least 25% of these nonexclusive harvesters sold 81% or more of their catch to primarily one dealer. **Figure 4.4** graphically looks at the *proportion sold to primary dealer* variable for nonexclusive harvesters. This variable appears to have a bimodal distribution. There is a strong peak at around 50% of catch sold to a primary dealer, and a weaker peak around the third quartile. The first peak represents those harvesters described above who switch often. Around the second peak are harvesters who switch less frequently. These harvesters appear to use long-term ties *and* the market, both trust and price, to coordinate their exchanges in the sea urchin industry. Rather than either trust or distrust, these harvesters use a plural form to coordinate their exchange.

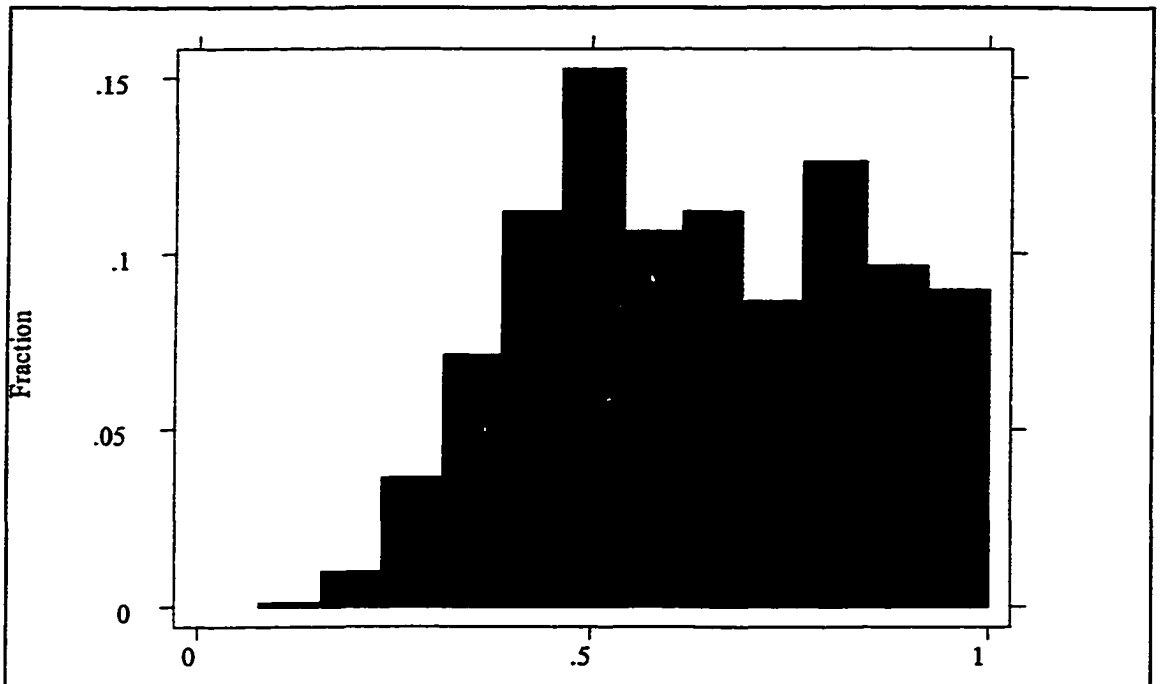

Figure 4.5 Distribution of *Proportion Sold to Primary Dealer* among Non-Exclusive Harvesters

Plural forms are exchange strategies employed by economic actors that combine two or more organizational forms simultaneously (Bradach and Eccles, 1989; Bradach, 1998). Rather than choose one form of organizing exchange (long-term ties and trust *or* the market and price) often times actors will combine both forms in unique ways given particular circumstances. Examining plural forms requires a step back from micro-level examination of transactions to examine the larger structure of transactions. Along with the social context of a single transaction, examining plural forms also considers the transactional context—how sets of transactions can influence the individual transaction (Bradach and Eccles, 1989:116); how the forms of coordinating exchange can overlap or become intertwined.

Perhaps a dealer who develops long-term relations with harvesters demonstrates the clearest example of using plural forms in the sea urchin industry. Thompson, who

works in the whole-live market, holds a number of long-term exclusive relations with harvesters like the ones we saw above. However, around Japanese holidays when the demand for sea urchins grows Thompson will supplement the catch from his regular harvesters by buying urchins on the market at the public pier. This simple strategy points to the importance of considering the plural form. There are clear advantages in the long-term ties for assuring steady supply and high quality. However, when the demand exceeds the capability of the long-term harvesters, the spot markets are an obvious solution to the problem. Not all plural forms are this straightforward, however, particularly when competitive strategies are introduced.

Some plural forms include a more subtle combination of long-term ties and markets in transactions. For instance, many harvesters utilizes a plural form in which they form long-term ties with a dealer for the advantages gained as describe in previous sections. However, these harvesters will maintain sporadic relations with one to three other dealers throughout the season:

> Well, we stay pretty much with one guy, and we always have another, you know, every once in a while we take them over to someone else, just so we don't burn all the bridges. Cause you never know.

One reason for using this form is to adapt to the volatility of the dealing sector. If a harvester's primary dealer drops from the industry, the harvester has other dealers he has worked with in the past, even if sporadically. This form also allows a harvester to check on the prices offered by other dealers; to be sure his primary dealer is not taking advantage of his loyalty. Some of these harvesters, during high demand times, might attempt to have their product bid upon at the piers.

The relation with the primary dealer in these cases resembles that of the long-term ties discussed in an earlier section. Harvesters often are paid once a week rather than on

the spot, and they do not try to trick their primary dealer in the evaluation of quality. In return, they receive a steady buyer for their product, even in slow times, and in some cases, they get other reciprocitive benefits for their long-term commitment. However, the trust is laced with distrust as well. One of the advantages of the long-term relationship for the dealer is not having a regular supply from the harvester and not having to compete for that supply. When the harvester sporadically uses other dealers, they are doing this behind the back of their primary dealer who would rather they stay committed. This combination of trust and distrust is clear when the harvester uses the secondary dealers to check on the price of his primary dealer. However, this monitoring does not lead to the deterioration of the relationship. Instead, the harvesters typically maintain the long-term tie and indirectly let the dealer know that his prices are not competitive. If the dealer moves to raise his price, harvesters see this as a sign of the trust, rather than proof of previous opportunism.

Plural forms are evident again when harvesters and dealers work within the different sea urchin markets, the whole/live or the processed market. As was discussed in Chapter 2, each market occupies a different fundamental niche. The whole/live market serves and elite customer and requires a higher quality sea urchin that typically receives a higher price per pound for the harvester. The processed market serves a mass retail market that does not require the high quality product and typically receives a lower per pound price for the harvester. The entrepreneurs in these different niches are not competing for the same demand, but there is niche overlap in securing supply. Many harvesters will work in both markets using a plural form strategy.

Harvesters working in the whole/live market maintain long-term trust based relations with a dealer. However, at times many will harvest a lower quality product headed for the processed market. Rather than coordinating these exchanges with trust, they exchange product at the market coordinated by price. This plural form is closely linked with fishing strategies. Harvesters in the whole/live market fish for high quality sea urchins on a regular basis, which requires looking for particular fishing grounds and using particular harvesting techniques. Harvesters often make the decision to fish for quality before leaving the harbor, when they choses fishing grounds. At times, the weather may limit access to some fishing grounds, or the harvester may stumble on a large bed of urchins not quite high enough in quality for the whole/live market. In these cases, the harvester decides to fish for the processed market, such as this diver who normally works in the whole/live market:

> We sold a couple of back loads to the Urchin King, Nicholas Cummings. He was notorious for buying anything. We gave him some garbage. It was more like, we're gonna sell to Cummings today. I know there's a bunch of them over here. Let's just go get a lot of them.

The fishermen harvest a slightly lower quality sea urchin, and may emphasize quantity in order to make up for the lower price paid for the product. Sometimes the harvester decides to fish for the processed market because of the higher prices being paid on the pier, taking the chance that selling a high quantity of lower quality at the pier will have a bigger payoff than the steady whole/live dealer.

While the whole/live dealer would rather have the harvester fishing for his market everyday, the harvester typically does not have to go behind the back of the dealer to sell to the processed market. The processor is not directly competing with the whole/live dealer in the Japanese market, and the whole/live dealer is not interested in the lower

quality product. The dealer does not mind the occasional switching as long as he can normally count on the steady supply from the harvester.

Troubles with Trust

A social scientist considering potential exchange relationships in the sea urchin industry might predict long-term exclusive relations would dominate the industry, and that trust and reciprocity would characterize those relations. Other inshore fisheries employ these long-term relations in their dealings and inshore harvesters and dealers move into new fisheries often. Institutional theory would expect these participants to carry organizational strategies with them into the new industry. The shared problems of exchange—indeterminacy and recurrent exchange leading to transaction specific costs—predict a similarity of organizational form also.

Although some harvesters and dealers have developed exclusive exchange relationships that are long-term and reciprocitive, a set of exchange relations quite different dominate the industry. Many harvesters and dealers coordinate exchange solely through the market and price mechanism attempting to maximize their utility at each transaction without concern for future transactions. The spot markets in the sea urchin industry, unique among inshore fisheries, evolved from the particular institutional development of this new fishery. The introduction of new actors from outside the working waterfront disrupted the process-based trust that characterized traditional forms of exchange. Rather than reestablish that trust, even under economic conditions that might favor that reestablishment, a distrust and opportunism came to motivate exchange relations.

The importance of the dissolution of process-based trust and the obstacles to reestablishing it should not be underestimated. For the dealer, having a set of exclusive long-term harvesters reduces and perhaps eliminates the possibility for competition. In addition, some harvesters show no interest in taking part of the auction-like atmosphere that occurs at the public piers. However, the piers rely on a group of dissatisfied harvesters unwilling to commit to one dealer. Similarly, the harvesters and dealers that balance strategies of long-term and market exchange rely on the existence of those markets. Without the persistence of those markets, the plural form strategies would not be possible.

CHAPTER 5

SOCIAL DILEMMAS

IN 1982, PROFESSOR LAWRENCE HARRIS AT THE UNIVERSITY OF NEW HAMPSHIRE encouraged local fishermen in New Hampshire and Maine to consider harvesting sea urchins. Sea urchin populations were growing in size and density, and threatened coastal ecosystems. Ten years later industry participants were calling for the state to impose harvesting restrictions. The sea urchin fishery had become one of the most valuable in the region, and many believed it was already harvested to the point of collapse. The decline of natural resources, ocean resources in particular, has become one of the late twentieth century's most pressing problems.

Figure 5.1 shows a dramatic increase in US East Coast sea urchin landings followed by a decline after 1993. Perhaps the Northwest Atlantic sea urchin industry is another case of the boom and bust syndrome of natural resource dependent communities.[47] This syndrome follows a set of steps where first a few pioneers demonstrate the economic viability of the resource, followed by an influx of capital and labor that increase extraction exponentially. At some point the resource reaches a limit at which it yields less and less to the extraction pressures. At this point, the costs of harvesting begin to exceed the value of the resource and extraction begins to fall off quickly. Freudenberg (1992) calls this the cost/price squeeze. Fisheries are renewable

[47] See McEvoy (1986:6) and McGoodwin (1990:65-88) for discussions of this syndrome, and the steps that production follows under these circumstances. See also Acheson and McCay (1988).

resources and receive somewhat more dire prediction from some analysts. Renewable resources are able to sustain some extraction and replenish resources naturally through reproduction. With renewable resources, extraction can increase to a point known as the maximum sustainable yield (MSY from here). Passing the MSY can dramatically decrease the potential for reproduction of a resource leading to a dramatic collapse of the resource (Catton, 1982).

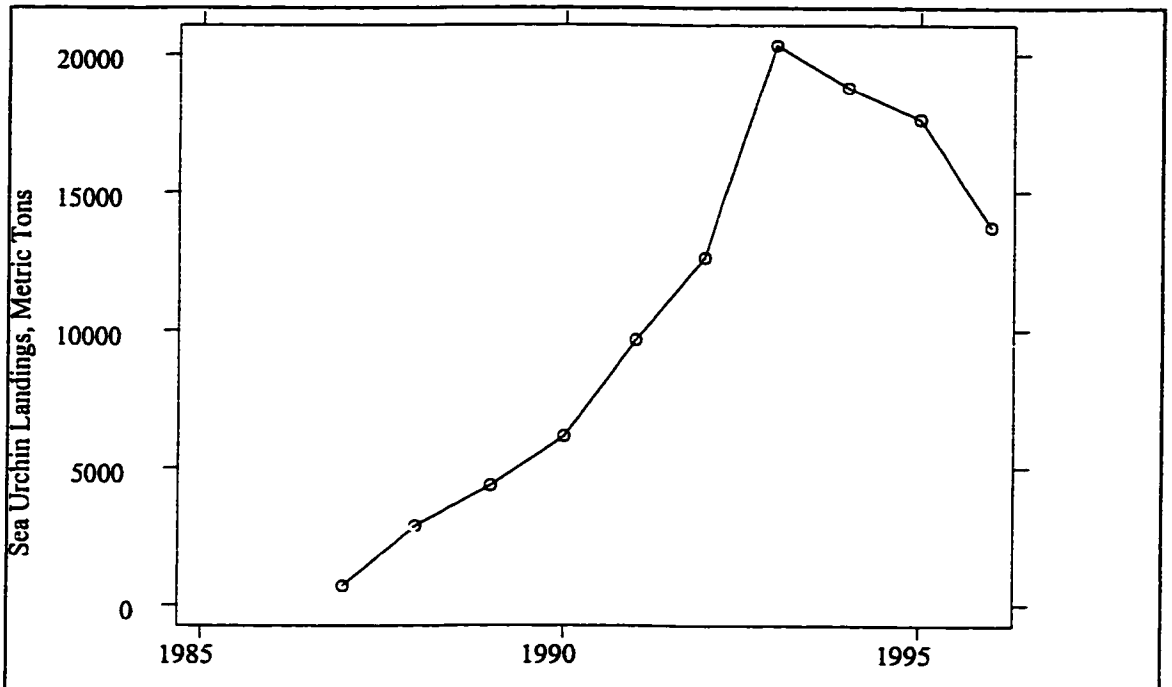

Figure 5.1 Changes in Northwest Atlantic Sea Urchin Landings (MT).

The most well known explanation for the boom and bust syndrome described above is popularly called the Tragedy of the Commons. This explanation considers the boom and eventual bust the result of the social dilemmas surrounding a common property resource. The explanation begins with the assumption that without limitations on access exploiters find it in their best interest to extract a resource quickly and completely before

someone else reaps the economic benefits from extraction.[48] The irony of these actions lies in the collective consequence of these individually rational actions. When individual actors act rationally, the collective consequence is worse for all involved.

As mentioned in Chapter 3, the tragedy of the commons thesis has been challenged based on the empirical research of social scientists examining fisheries from an institutional perspective. This research has found that the absence of private property and open access are not synonymous. The openness of a public resource is variable from case to case, and more often than not some participants are excluded or limited from production through formal and informal means. Social institutions can solve the social dilemma of a common resource through limitation and control of extraction.

If problems with the tragedy of the commons explanation exist, what alternative explanation is there for the dramatic rise and development of the Northwest Atlantic sea urchin industry? The social researcher must explain why this outcome developed rather than some alternative outcome. I believe my analysis of the sea urchin industry and those processes found between supply and demand provides some insights to these questions. In this chapter, I discuss the influence of the particular entrepreneurial, labor and exchange processes on the extraction of resources, and the reaction to resource depletions. First, I look again to the coastal ecology the sea urchin is a part of, and address the resource declines, which scientists, state managers, and industry participants predominately acknowledged. Following this, I discuss how the processes examined in previous chapters provide some insight into how the industry came to resemble the boom

[48] See Hardin (1965). For a discussion of this explanation and problems with it from an anthropological perspective see McCay and Acheson (1988) and McGoodwin (1990:89-96). I have already discussed this issue in Chapter 3.

and bust scenario described above. Finally, I consider the likelihood of participants being able to overcome the obstacles to solving this social dilemma.

Sea Urchin Resource Declines

The coastal ecological zone is not a static community, and it seems that extreme high or low densities of sea urchin populations can have a significant affect on the ecosystem.[49] Sea urchins are found in shallow inter-tidal pools or in depths as great as 80 to 90 feet. They are most common in the shallow subtidal zone under 30' on rocky, gravely or shelly bottoms. As urchin populations grow, they tend to wipe out regions quickly. The speed and efficiency of this process has even been termed an "outbreak" of sea urchins.[50] The urchins form feeding fronts, or feeding lines, that can decimate an area by cleaning the ocean bottom. After clearing an area, large populations of urchins cover the ocean floor assuring no other coastal life returns. Harvesters and scientists alike call these areas "the urchin barrens".

Decreases in sea urchin populations can change the coastal ecology dramatically as well. Sea urchins are the largest and deepest grazing herbivores in this coastal region. Consequently, they have the largest affect on macroalgea (kelp) growth. Decreases in urchins allow kelp beds to grow more freely. An urchin die off in the Caribbean has led to increased kelp growth that is responsible for the destruction of coral reefs in the region. Along the Maine coast the increases in kelp beds has created more shelter for lobsters, and possibly more protection for lobsters from predators.

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[49] See Steneck (1996) for an interesting review of the interdependent web of marine ecosystems and the effects of changes in that web.

[50] In Harris (1994).

Sea urchin populations change based primarily on the presence of predators, natural and human. Marine biologists working in the Gulf of Maine have long been aware of this. For many years, sea urchin populations in the Gulf of Maine were able to grow without check. Steneck (1996) finds that the decline of natural predators for the sea urchin, and the lack of a commercial fishery led to the growth in size and density of sea urchin populations in the Gulf of Maine.[51]

The introduction of a commercial fishery reversed this process, leading to the decline in sea urchin populations. Biologists have found evidence for these declines through the long-term study of coastal research areas (Steneck, 1996). The tremendous growth of kelp beds along the coast, without the impact of large urchin populations, is further evidence of this decline.

Evidence for the decline of sea urchin populations comes from declining catch size and increased fishing effort in the industry, also. The DMR collects data from harvesters on effort and catch size on a regular basis. They have found regular increases in the effort expended for a smaller catch size.[52] The harvesters that have been working in the industry since its early days have seen the resource declines and experienced increased effort first hand:

> What happened was, back in the 80's, like '85 I was getting myself 45, 50 trays a day. Then the next year it dropped down to 40 trays, then 35, then 25, then 20, 15, now we're down to 10 on a good day. An average day now is about 7 trays.

[51] Diseases have also checked sea urchin populations. Large die offs have occured in Nova Scotia and in the Caribbean.

[52] Margaret Hunter and Ted Creaser, personal communication.

When the industry first started harvesters could bring in a large catch with little effort. In some cases, harvesters literally shoveled sea urchins into their boats. Today those areas have fewer or no sea urchins left.

> We used to get, Christ, 60, 100 boxes. Sometimes we'd go out twice, go out and load up, come in and unload it, go back out again. When we first started, the places that had the most urchins still have urchins now. But there were places when we first started that you could clean out in one day. Those places don't have any urchins now.

Where once there were few predators, sea urchin populations began to feel the brunt of commercial fishing. Perhaps it is unsurprising that the introduction of harvesting would cause sea urchin populations to decline some. However, biologists, state managers, and harvesters alike express doubts about the sustainability of the current level of extraction. Below I look at how the economic processes discussed in previous chapters contributed to the increased level of harvesting.

Economic Processes and Resource Declines

At first, it might seem that the flexible production strategies discussed in Chapter 3 might have led to the over-harvesting of the sea urchin resource. This may be a hasty conclusion. The institutional arrangements of the working waterfront undoubtedly contributed to the ease in initiating this new fishery. However, institutional arrangements such as these are more likely to control access and production, and solve commons dilemmas. Instead, two other elements of the industry's development appear to create a dilemma similar to Hardin's tragedy. First, the social construction of open access left the sea urchin resources open to all interested. Second, the way in which outsiders came to the waterfront context and took advantage of the waterfront institutions. Below, I look first at the social construction of open access. Following this, I summarize the flexible

production arrangements of the waterfront, and how outsiders to the industry took advantage of these institutions to move into the new industry.

The Social Construction of Open Access

The lack of formal and informal barriers to access of the sea urchin resource allowed extraction to proceed unchecked. Neither the State, nor the local communal arrangements surrounding the waterfront limited access to this new resource. The State of Maine and the DMR were primarily responsible for the formal management of the resource. They did not impose any restrictions on access for two reasons. First, there was no precedent for this kind of limitation, and no leadership was prepared to set a precedent with this fishery. Second, at that time the State, from the Governor to DMR was primarily concerned with developing ocean resources, particularly underutilized species.

Although local inshore fisheries, particularly the lobster fishery, have a reputation for being territorial, informal barriers to access did not develop either. There are primarily two reasons for the lack of informal limitations on access. First, the territorial actions of harvesters are species-specific. Not being harvested previously, no harvesters laid claim to this species. Second, the new fishery had a number of unusual qualities that discouraged already established harvesters from taking an interest. Most notably, many established harvesters considered the sea urchin a trash fish, and it required a new technology, SCUBA diving, for harvesting.

Flexibility and Resource Extraction

Open access alone is not enough to explain the initiation and growth of the industry. The flexible production arrangements of the working waterfront form an important part of the explanation. Particularly, these arrangements allowed new entrants to inshore fishing to work in this fishery quickly and easily. Two aspects of the working waterfront contributed to the quick growth of the sea urchin industry: the already existing technical and social infrastructure. Below I look more closely at each.

Technical Flexibility

The sea urchin industry was able to develop quickly because of the already existing technical infrastructure of the working waterfront. This includes a fleet of fishing boats outfitted with fishing gear, and the many wharves, building and roads on the coast devoted to commercial fishing industries. An important quality of that infrastructure is its flexibility. This is particularly important concerning inshore fishing boats and gear. The inshore fishing boat is uniquely suited to adapt to the uncertain movements of marine populations, and suited for harvesting a variety of different marine species. In the early years of the industry, harvesters using boats in a variety of other fisheries switched to the sea urchin fishery.

Similarly, harvesters easily adapt fishing gear for different purposes. This may include changes that improve fishing in a particular fishery, or changes that allow harvesting of a different marine species. In the early years of the sea urchin industry, harvesters adapted their dragging gear from use in the scallop or oyster fishery to work in the sea urchin fishery. The Northwest Atlantic sea urchin fishery is the only sea urchin fishery to use the dragging technology.

Social Flexibility

The already existing social infrastructure of the waterfront allowed the quick movement of dealers and harvesters into the sea urchin fishery. Inshore harvesters make and break collaborative relations easily. In establishing the sea urchin fishery, the collaborations between inshore boat owners and SCUBA divers were particularly important. Individually, neither would be able to work in the sea urchin fishery. However, cooperation brought the two technologies together and allowed for work in the new industry. This type of cooperation is common on the waterfront, and the ease with which it is accomplished led to the speedy increase of resource extraction.

An important aspect of these relations is their open quality. Harvesters already embedded in the waterfront context did not limit their collaborations to other established harvesters. Instead, these collaborations allowed new entrants to enter the productive context of the working waterfront to begin harvesting sea urchins quickly. This was particularly important in the sea urchin fishery that utilizes the SCUBA technology. SCUBA was not already a part of the inshore fisheries, but it was able to become a part of the waterfront through collaborations between established harvesters, and new harvesters. This open quality is an important part of the industry adaptation and growth.

This process of flexibility and openness is also clear when we look at the entrepreneurial process, comparing the traditional entrepreneurs with new entrepreneurs. New entrepreneurs found it difficult to mobilize labor to harvest sea urchins, while traditional entrepreneurs mobilized harvesters quickly and easily. The difference lies in the long-term collaborative relations that exist between traditional entrepreneurs and harvesters. Moving into a new industry includes taking some risks, and long-term

relations based on reciprocity and trust have advantages when taking such risks. Traditional entrepreneurs were able to mobilize harvesters quickly and easily in the new industry. As the industry developed, the new entrepreneurs turned to these local dealers in order to get started in the new industry.

Processing and Expansion Orientations

The new harvesters and entrepreneurs were not committed to other pursuits on the waterfront, and they developed their own economic strategies in the industry. For instance, many harvesters attempted to work year round, without balancing the sea urchin with other fisheries. Perhaps more important, the new entrepreneurs adopted an orientation towards expansion that lead them to integrate the processing activities of the industry. Processing required an increase in size and scope of harvesting networks, and led to increased pressure on the sea urchin resource. A fierce competition developed among processors as they grew, also resulting in increased pressure on the resource.

Solving Social Dilemmas

Looking back at **Figure 5.1** shows that sea urchin landings on the East Cost of the US have declined after 1993. Certainly, part of this decline is due to the over-harvesting that occurred in the industry. Other factors have contributed to this decline in landing as well. First, the State of Maine and the DMR began to limit harvesting in the fishery beginning in 1994. Second, a type of cost/price squeeze as described by Freudenburg (1992) has occurred in the industry. Adapting to these changes, and controlling over-harvesting are social dilemmas, and only the future will tell if the sea urchin industry will solve these dilemmas. Below I look first at the State limitations on harvesting and the cost/price

squeeze in the industry more closely. To conclude, I consider the ability of the industry to adapt to these changes and solve the problem of over-harvesting given the analysis of previous chapters.

State Management Actions

Before 1993, DMR did not pay particular attention to the sea urchin fishery. Anyone could obtain a commercial fishing license and harvest sea urchins. In the early 90s, as the industry became a larger part of the Maine economy, the state and DMR began to pay more attention to this fishery. In 1993, the Legislature passed "An Act Concerning the Taking of Sea Urchins" to go into affect in January 1994. The act limited access to the resource in two ways. First, it restricted urchin harvesting from June 15 to September 15. During this time, no urchins could be harvested. Harvesters were also required to purchase from the DMR a license to harvest urchins. In order to harvest urchins a fisherman must hold a license, and must be a Maine resident to obtain a license.

In 1994, the legislature again passed legislation concerning the resource, "An Act to Conserve the Sea Urchin Resource." Most significantly, this measure created a limited access fishery. Commercial sea urchin harvesting licenses were opened up one last time before restricting new entrants to the fishery. In the years 1994 to 1998, the DMR sold harvesting licenses only to those fishermen already holding a license. Harvesters can not sell or give away a license. The diving and dragging gear types require separate licenses.

In addition, the 1994 legislation enacted a surcharge of $160 with the purchase of a license in order to create the Sea Urchin Research Fund. This research fund remains one of the primary sources of funding for scientific research. These funds are designated for research needed for better understanding of urchin resources. When the legislature

formulated this research fund, they were not clear about who would conduct the research on sea urchins. The Department of Marine Resources does not have the personnel to conduct this research, so they distribute the funds to academics.

Following legislation passed in 1995 urchin harvesters must choose between two zones in which they will work. Zone 1 runs West from Penobscot Bay to Kittery. Zone 2 runs East of the Penobscot Bay line to Canada. Harvesters choose a zone when they purchase their license and are restricted to that zone for the entire season. Within the boundaries of the fishery season, each zone receives a set number of days in which the fishery is open. In 1996-1997, Zone 1 was open for 150 days and Zone 2 for 170.

DMR has created the Sea Urchin Zone Advisory Council (SUZAC) in order to allocate the days at sea in each zone. This committee includes DMR officials, divers and draggers from Zones 1 and 2, buyers and processors, and some scientists involved in fisheries management. The initial purpose of the Council was to establish exactly which 150 days for Zone 1 and 170 days for Zone 2 would be open within the season. This involves a complicated task of considering Japanese holidays, US holidays, and predictions about the market. As the council has evolved it is now taking on more responsibility with managing the fishery. This includes becoming a liaison with the industry, managing the research fund, and advising on future management plans for the fishery.

Most recently, the SUZAC reopened the fishery to new entrants. The limited access established in 1994 ended in 1998, necessitating this move. The plan opens the fishery to restricted number of new entrants based on the number of current harvesters who do not renew their licenses. This method will decrease the size of the overall fleet.

The new plan includes a requirement that new entrants have some experience in commercial fisheries by only considering those with a license in some other commercial fishery eligible for entrance.

Cost/Price Squeeze

In the Introduction to this analysis, we saw that favorable exchange conditions provided a door to the sea urchin industry that did not exist previously. In 1971, President Nixon instituted a floating exchange rate to replace the fixed exchange rates. For the Yen to Dollar exchange, these changes resulted in a decline in value of the Dollar vs. the Yen resulting in favorable export conditions from the US to Japan. In 1970, 360 Yen could buy one Dollar worth of US goods. In 1993, 360 Yen could buy over three Dollars worth of US goods. The dropping value of the Dollar compared to the Yen has continued with the Japanese Yen able to purchase more US goods for the same price as the value of the Dollar drops.

When competition in the industry increased these favorable exchange conditions allowed entrepreneurs to increase the prices paid for sea urchins and still maintain a profit. Over the last few years, this has become more difficult. The strength of the Yen has declined versus the Dollar, decreasing the profit margin that previously existed. This, along with the troubled Japanese economy, has decreased demand for the Northwest Atlantic sea urchin.

Solving Social Dilemmas

Perhaps the existence of the flexible productive arrangements on the waterfront and the possibility of open access to the ocean resources make the fishing industries

prone to problems of over-harvesting. However, limiting the flexibility of the working waterfront, including access to the ocean resources, does not seem like a valuable solution. That flexibility may be the region's greatest strength, particularly when confronted with the volatility of international markets in specialty products. One potential solution to the problem of over-harvesting lies in the state management of the resource. As we have seen, the State has taken actions that likely have decreased pressure on the resource. However, these measures themselves add to the uncertainty of the industry and require flexible adaptations by participants. Perhaps another solution to over-harvesting lies in the responsible management of the resource by those actors participating in the industry through informal controls on harvesting. Social anthropologists have documented these kinds of institutional arrangements in a number of common property like circumstances (see McKay and Acheson, 1987).

Trust, Social Dilemmas and Sea Urchins

Key to the success of these types of informal arrangements is the level of trust that exists among participants in these fisheries. Coleman (1988; Messick et al., 1983) finds that trust in interpersonal relations, including economic exchange relations, can translate into action for solving collective problems. We have already seen the importance of trust in economic relations contributing to the flexible adaptations on the working waterfront. In order to adapt to future changes in the market and state management, and to attempt informal solutions to commons problems the level of trust in the sea urchin industry will have to be high.

The outlook for trust solving the dilemmas imposed on the sea urchin industry is not optimistic given the analysis in Chapter 4. Currently, there are substantial obstacles

to establishing trust in the sea urchin industry. If the problems of declining markets, increased State management, and over-harvesting continue it does not seem likely that many participants will remain in the industry. These problems are not restricted to the harvesting sector, but include the coast-side dealers and processors who, without the establishment of trust based relations, may find themselves unable to solve the problems of market, state and resource decline.

This may be too dire a prediction for the industry. There do appear to be some potential solutions to the problems described above. For instance, consider the long-term trust based relations that have developed in the industry. These trust based exchange relations may be able to adapt to the changes in market and state management without having to exit the industry. As the changes persist, these relations may come to dominate the industry as the other participants exit. There is also the possibility that harvesters and dealers currently not utilizing trust in their exchanges may develop trust based relations in reaction to the changes in market and state management. However, it remains to be seen if these trusting relations will translate into institutions that control resource extraction and solve the problem of over-harvesting.

Future Research Directions

Economic sociology does not address questions of natural resource extraction directly. However, I believe the analysis in previous chapters provides some insight into these processes. In particular, the analysis of the organizational dynamics between supply and demand provides insights into the boom like growth of the industry, and provides evidence for speculation on the ability of the industry to overcome the social dilemmas confronting it. It is not only a set of harvesters extracting a fishery resource, but an

organizational field perched on the edge of a common property. Understanding the particular dynamics of that organizational field provides insight into the extraction of natural resources.

Examination of these natural resource questions in the Northwest Atlantic sea urchin industry is one future research direction that might develop from this analysis. Related to these questions, future research might examine the political processes associated with the management of the resource. This research direction could explore a number of interesting questions, including 1) Examination of the state bureaucracies that came to promote some controls on production. The state underwent a transition from trying to promote production of the sea urchin resources to trying to control production of those same resources. 2) Examination of the mobilization of industry participants to promote or discourage management. Some of the first calls to control production came from the industry participants themselves, and after the state began to implement controls many participants called for the reductions on controls. 3) Future research might also attempt to discover the controls on production that best suited the industry and promoted a sustainable commercial fishery. Rather than one best universal solution to these problems, this research might attempt to uncover the management measures best suited to this particular industry.

Another research direction might take a macro look at the natural resource questions involving the international sea urchin industry. The Introduction shows that the Northwest Atlantic sea urchin industry is only one area of the world that has experienced the growth in sea urchin harvests since the 1970s. Other sea urchin fisheries have developed in the Pacific along the coasts of North and South America, and along the

coasts of South Korea and the East Coast of Russia. The existence of these fisheries also raises a number of interesting questions: 1) Examination of the similarities between these fisheries. These fisheries have all developed in the last 25 years, and once started have developed quickly. 2) Examination of resource dependence and resource stability in these areas. The development of these fisheries may rely on an existing infrastructure of commercial fishery extraction, and the instability of resources may contribute to the development of the sea urchin fisheries. 3) Examination of the dynamics of global fisheries industries. Japanese companies are known for there global reach and have played a role in the development of sea urchin fisheries in the Northwest Atlantic and around the world.

A final line of research might compare the sea urchin industry with other "new" fisheries that have developed in recent years. These are fisheries for unusual species that have seen little harvesting pressures until the last 25 years. Since then, growing markets in Japan and other Asian countries have increased demand for these species. Comparing the economic processes in these fisheries with those found in the Northwest Atlantic sea urchin industry could further develop some ideas from the analysis presented here: 1) Examination of similarities between economic processes in these fisheries. Some general processes that are associated with these new fisheries might develop through comparison. 2) Examination of some new fisheries that were not successfully developed. These comparisons might uncover characteristics that are essential to the success of new fisheries like the sea urchin.

Each of these research directions use the analysis of the organizational dynamics of the Northwest Atlantic sea urchin industry as a springboard to new and interesting

directions of research. In the Conclusion that follows, I return to this analysis and the questions posed at the beginning of this dissertation.

CONCLUSION

REVOLUTIONARY CHANGES ARE AFOOT ALONG OUR NATION'S COASTS. THIS RESEARCH has examined the organizational dynamics of the Northwest Atlanitc sea urchin industry within changing environments. I have characterized the Northwest Atlantic sea urchin fishery as one of a set of *new* fisheries that rely on a unique set of political, economic and social resources. These new fisheries rely on new global demands. The Northwest Atlantic sea urchin fishery is one of many new fisheries supplying the unique tastes of Asian consumers, in this case the Japanese. This demand relies on contemporary changes of international monetary arrangements. International monetary arrangements have changed from fixed to floating exchange rates, and the value of the US Dollar has declined versus the Japanese Yen. This change makes US products cheaper for Japanese customers, and makes export of sea urchins to Japan economical. To accompany these changes in monetary policy the US government attempted to increase US exports. Trade barriers with Japan were renegotiated, and barriers diminished in seafood exports in particular. Responding to these changes many local governments encouraged development of these new markets of seafood products.

These fisheries have unique supply characteristics as well. They rely on common property resource with State bureaucracies holding ultimate rights over the resources. As with other extractive resources, there is a finite supply of these fishery resources even with the potential of reproduction. These are characteristics of all fishery resources, but

the new fisheries are further unique for being unusual, underutilized species. In the Northwest Atlantic, no significant fishery for the sea urchin existed before 1985; no one had an interest in the species. There was no substantial market to speak of and State agencies did not regulate or monitor harvesting. These coasts have a long tradition of industries working in traditional fisheries such as groundfish and lobsters, but these industries have been contracting due to over harvesting of the resources and increased state regulations. As traditional fishing industries contract, these new fisheries, serving Asian customers, have begun to transform the coasts.

This research follows the evolutionary path of organizational development resulting from these changes in ecological circumstances. The analysis here focuses on the economic and organizational processes between supply and demand asking two primary questions: What kind of economic organization has come to fill this new resource niche? Why did this form of economic organization develop?

Economic Organization of the Northwest Atlantic Sea Urchin Industry

This analysis began with a goal of uncovering the form or forms of economic organization that have come to fill the resource niche between supply and demand in the Northwest Atlantic sea urchin industry. This assumes that a variety of forms can solve the problem of organizing production, rather than assuming one uniquely possible solution exists. Below I review the conceptual schema for examining variation in economic organization. I follow with a discussion of the forms of organization that my analysis has uncovered in the Northwest Atlantic sea urchin industry.

Forms of Economic Organization

This research agenda in economics originally worked with a dichotomous conception of the ways economic activities could be organized: markets or hierarchies (Coase, 1937; Williamson, 1975). Markets include one-time exchanges of a large number of self-interested anonymous actors. The pursuit of self-interest and the price mechanism allow for short term relations of mutual satisfaction. In the market ideal, no lasting or integrated relationships exist. Hierarchies integrate the division of labor through formal bureaucratic organization. Exchange flows through long-term relations governed by an authoritative power structure. Large firms create hierarchies by maintaining control of the production flow from manufacturing to distribution - called vertical integration. A productive enterprise may purchase resources from other productive enterprises through market exchange. Distribution of the product could flow through market transactions also. However, a hierarchical, vertically integrated firm organizes these transactions under a system of authority and centralized control rather than market exchange.

This analysis falls within an exciting vein of research by economists and sociologists on economic organization that has come to challenge the market-hierarchy dichotomy. These social researchers have found that actual forms of economic organization, found through empirical observation, often vary from the market and hierarchy possibilities. Institutional economists have considered these variations hybrids of market and hierarchy including aspects of both forms of organization. Sociologists consider these variations a form of economic organization wholly different from market

and hierarchy. Rather than market or hierarchy, they consider these economic activities organized through networks.

In a production network resource allocation and transactions flow through small-firms linked by reciprocal mutually supportive actions (Powell, 1990b:317). In contrast to formal organizations, networks are non-hierarchical; in contrast to markets, networks include long-term exchange between actors.

Thorelli (1986) describes networks consisting of a set of positions, or nodes, and a system of links between nodes. An actor occupies a position and the network relations reflect established long-term links. Long-term ties create stronger boundaries around relations than market exchange, but the links also allow for access and exit depending on circumstance. Networks can easily change and adapt, but also include more substantial relations than anonymous exchange. Powell (1990a) describes networks as "lighter on their feet" than hierarchies, and more easily adapting to uncertain supply and demand environments. Although relations are less formal than within vertically integrated firms, there are more established, long-term relations than in market forms of organization.

For Powell (1990a) the quality of relationships, particularly their reciprocity, differentiates a network from markets and hierarchy. Rather than anonymous exchange, relationships include actors that share resources. Similar to markets, but through the process of sharing, each individual participating gains advantage. However, the actors are not in a short term, self-interested pursuit, but act with concern for the interest of other members of the network. A single transaction between two network participants may not include mutual satisfaction. One member may end up slightly better off than the other. However, over the course of many exchanges a balance of satisfaction and

detriment develops. In this form of organization the relationships themselves become valuable to both parties (see Coleman, 1988), and participants work to maintain them through obligation and cooperation (Macneil, 1978, 1985). According to Powell (1990a), the emphasis on relationships in networks creates advantages in production environments with uncertain resource supplies or demand. Producing in these environments requires regular innovation and adaptation to changing circumstances. Information is essential to this process. Strong reciprocal ties provide flows of reliable information better than markets or hierarchies.

The Northwest Atlantic sea urchin industry includes aspects of both the network and market forms of economic organization, which I discuss below. Two unique organizational strategies resemble the network forms. The first form is most common in the whole/live market for sea urchins. Here production is organized with a quasi-firm strategy. The second form is found primarily among those firms working in the processed market. Here large processing firms organize production with a business group strategy. Along with these network relations, there exist unique market-like relations between harvesters and dealers in the processing sector of the industry. In addition, the institutionalization of these forms of exchange in the sea urchin industry allows for plural forms of organization to operate in the industry.

Network Organizational Strategies

Quasi-Firms in the Whole/Live Market

In his research on the construction industry, Eccles (1981) found that general contractors and their subcontractors develop stable and continuous relationships that last

over long periods of time. Although there are possibilities for opportunism, no hierarchical form of organization develops. Instead, general contractors and subcontractors tend to develop long-term and exclusive relationships. A similar form of organization has developed in the whole/live market for sea urchins in the Northwest Atlantic sea urchin industry.

Rather than integrating activities in the industry, those firms working in the whole/live market tend to establish long-term relations between individual firms performing the essential tasks of production. Dealers along the US East Coast have established exclusive ties with Japanese processing companies that last for a number of years. The US dealers are responsible for securing a supply of sea urchins. The Japanese firm is responsible for processing of the product, which takes place in Japan. The dealer and processor cooperate on transporting the product with the US dealer responsible for transporting the product to an international airport where the Japanese company takes over.

Similar to the general contractors in Eccles research, these dealers establish long-term exclusive ties with harvesters. The whole/live market serves an elite customer in Japan; the demand is smaller than that for the processed market, but consistent. The whole/live entrepreneurs need a high quality product, but consistently pay higher prices. Under these conditions, long-term exclusive relations based on reciprocity have developed between buyers and sellers. The high quality market makes the dealers careful with quality estimates, usually requiring a day of evaluation before determining the value of a harvesters catch. Harvesters get some advantages in these relationships, most notably higher prices. Dealers will make other arrangements for the harvesters such as

filling air tanks and arranging to pick up a harvester's catch if necessary. A close coordination of activities develops in these relationships, with harvesters and dealers talking daily about their working arrangements. The coordination is reciprocitive coordination, however. Dealers do not rely on the catch of a particular harvester alone, and the harvester could find another dealer to sell his catch. The two work together out of a mutual satisfaction that develops over regular exchange.

The quasi-firm relations in the whole/live industry look very much like the network form of organizing production described by Powell (1990a) and others. Exchanges do not flow through bureaucratic lines; neither are they onetime anonymous transactions. Instead, exchange appears to be somewhere between these extremes, flowing through long-term, coordinated exchange relations based on trust and reciprocity.

Business Groups in the Processing Market

A second form of organization follows what I call a business group strategy. At the center of the business groups in the Northwest Atlantic sea urchin industry are the larger processing firms of the industry. Rather than ship whole/live sea urchins to Japanese processors, these dealers integrated the processing activities, and complete them in North America. The processed product is then shipped to Japanese partners who act as brokers for the product on the Japanese market. The market for sea urchin processed in the US is larger than the whole/live market, but it is a lower quality market also.

The unique organizational quality of these business groups lies in the way they organize their supply networks. The business group entrepreneurs buy a larger quantity of sea urchins, and they do not restrict themselves with regional divisions along the coast. Instead, these entrepreneurs set up a series of buying stations along the coast in order to

have a presence in as many regions as possible. The buying stations act as coast-side dealers, securing harvesters catch and transporting the product to the large processor. Each of these buying stations is a formally recognized dealer independent of the processor, but sells their product exclusively to this processor. The members of a group do not compete among each other, and in the region where a buying station operates, industry participants know what business group the dealer works within.

Business groups attempt to garner a large supply of sea urchins, and to compete with other business groups with the same goals. The region of a buying station is carefully chosen in order to assure buying stations within the same group do not compete with each other, and in order to assure competition in a region where another business group operates. Business groups monitor each other's behavior and follow each other into new regions establishing buying stations in order to assure competition with each other.

A business group is a network of firms that regularly collaborate over a long period of time; they are neither completely integrated, nor loosely integrated (Granovetter, 1994; Powell and Smith-Doer, 1994). The relationship between the large processor and the regional buying stations resembles the business group form. The firms are a set of cooperating firms that are not completely integrated. The relationships are more integrated than those of the quasi-firm, however. They do not develop over a period of regular exchange. Instead, participants agree upon the terms of the relationship before the first exchange occurs, and there is more dependence between partners to the exchange. If the relationship between processor and buying station were to end abruptly, a buying station would find it difficult to find another processor to work with. Similarly,

the processor would find it necessary, but difficult to establish another buying station. Finally, the relationship is more hierarchical than vertical, with the processor holding more authority in the relationship.

Market-like Exchange Strategies

Rather than the long-term exchange relations between harvesters and dealers in the whole/live market, these exchanges in the processing sector have market like characteristics. These coast-side dealers and harvesters tend to have non-exclusive, market like exchange relations governed by price. When business groups establish buying stations in a region competition between dealers can become fierce as they attempt to undercut prices. Some harvesters are drawn to these regions, where competition raises prices. Harvesters do not sell to one buyer exclusively, but to the highest bidder instead. This market like exchange governed by price culminates in a series of spot markets that have developed along the coast at public piers. Rather than trust and reciprocity, these exchanges are often rife with opportunism and guile.

The competition in the processing sector is not solely between rival business groups. A set of transient dealers has come to form an important part of this competition. Similar to the business group processors, this group exports processed sea urchin to Japanese businessmen who act as brokers. However, this group processes a smaller amount of sea urchins, and operate smaller processing plants. This group does not have the financial ability to establish buying stations following the business group strategy. Instead, these processors travel to ports where markets already exist to compete with the business group processors and other transients. Transients may visit the same port regularly, but it is not unusual for them to visit a number of ports and compete in

different markets. The presence of transient dealers further increases the intensity of competition at the markets.

The competition at these markets is not strictly anonymous, nor one time. In the case of the established buying stations of the business groups, harvesters and dealers often are quite familiar with each other. Exchanges with transient dealers are closer to, if not completely anonymous. Despite the amount of anonymity, the exchanges closely resemble market exchange in that participants make exchange governed by price without concern for future exchanges.

A Note on Plural Forms

As the organizational strategies described above became institutions in the Northwest Atlantic sea urchin industry, the opportunity for participants to use plural forms of organization arose. Plural forms are exchange strategies employed by economic actors that combine two or more organizational forms simultaneously (Bradach and Eccles, 1989; Bradach, 1998). Rather than choose one form of organizing exchange (long-term ties and trust *or* the market and price) often times actors will combine both forms in unique ways given particular circumstances. This is most notable among harvesters. For instance, harvesters who work primarily in the whole/live sector may use a spot market when the whole/live demand is low. Similarly, a dealer in the whole/live sector may turn to the spot market when his demand is higher than his regular harvesters can supply. In this way, the existence of the market allows for additional organizational strategies that use more than one form of organizing exchange.

Economic Sociology and the Social Construction of Industries

One of the driving motivations of this research has been the assumption that the Northwest Atlantic sea urchin industry might not have been followed this path of development. Rather than one rational way to organize production, a variety of strategies exist. Above I document the forms of organization that exist in the Northwest Atlantic sea urchin industry. Below I examine the social construction of those organizational forms, to uncover how these forms of organization became established in the industry rather than some other. For this, I turn to the concepts of economic sociology. At its core, the New Economic Sociology has developed a set of sociological concepts for understanding economic action that counter the neo-classical economist's atomized rational actor (see Granovetter, 1985). Block (1992) finds three sociological concepts central to a sociological understanding of economic processes: 1) economic action is embedded within existing social and cultural networks, 2) the role of imitation in structuring economic action, and 3) the importance of blocked exchanges. Each of these concepts plays a key role in my analysis of the construction of economic institutions in the Northwest Atlantic sea urchin industry. A fourth concept, the shared set of expectations by those involved in economic exchange has also played an important role in my analysis. Below I look at each of these concepts and their role in the development and the organizational dynamics of the Northwest Atlantic sea urchin industry.

Embedded Economic Action

The concept of embeddedness maintains that the individual economic actor is not able to disregard existing and ongoing social ties in their economic actions (Block, 1992; Granovetter, 1985; Polyani, 1957). Instead, an actors wide ranging social and cultural

ties influence how they respond to economic signals. Social ties both allow actors to take certain economic actions (in the form of social capital), as well as restrain the actions of economic actors (in the form of inertial pressures).

Social Capital and Inertial Pressures

In many cases, existing social relations provide essential resources for the economic actions of individuals—starting a business or finding a job for instance. In these instances the actual social ties provide the actors with a resource known as social capital (Coleman, 1988). Capital most commonly refers to some form of physical or financial capital. Economists use the concept human capital to refer to an individual's skills and education that provide an economic resource (Becker, 1964). This extends the concept of physical capital embodied in tools, machines, and other productive equipment to individual persons. Similarly, social capital extends the idea of capital to find economic resources in the existing and ongoing social relations individuals hold.

In contrast to the ability for action provided by social capital resources, existing social relations can limit the ability of economic actors to take advantage of opportunities. Hannon and Freeman (1984, 1989) call this lack of movement inertia. They find expectations and reputations associated with existing social ties, and actors sometimes move slowly in order to fulfill those expectations and to maintain their reputations. Institutional sociologists call these normative pressures, or guiding conceptions of control (DiMaggio and Powell, 1983; Fligstein, 1996). Economic actors do not write off their existing ties lightly, and they do not write off their reputation and the legitimacy associated with it. Instead, they act to maintain these ties in ways that limit their autonomous actions. Following this, actors *not* embedded within existing ties

do not share the social capital advantages, but they do not share the limits on their autonomy either.

Embedded Action and the Northwest Atlantic Sea Urchin Industry

Entrepreneurial Processes. Social capital and inertia were key to the development of the Northwest Atlantic sea urchin industry. The advantage traditional entrepreneurs held in mobilizing labor for the new sea urchin fishery clearly demonstrated the social capital advantages they held. Over time, these entrepreneurs had developed relationships with harvesters based on reciprocity and trust. These relations made it easy for the traditional entrepreneur to ask harvesters to take the risks associated with working in the new fishery. In fact, looking for these types of opportunities was part of their working relationship. As a result of their being embedded in this set of ongoing relations on the waterfront, these entrepreneurs considered the process matter of fact. The contrast with the business group entrepreneurs made the advantage held by these entrepreneurs particularly clear. These entrepreneurs were getting involved in the new industry at the same time, but did not have the existing, ongoing relations on the waterfront. Rather than matter of fact, getting started in the new industry was difficult for these new entrepreneurs. Eventually these entrepreneurs from outside of the waterfront had to turn to dealers already embedded on the waterfront in order to get established. These relationships with dealers were the first buying stations as these entrepreneurs began to organize along the business group lines.

The existing and ongoing relations of the traditional entrepreneur provided them with an advantage in establishing themselves in the new fishery, but these embedded relations also inhibited the extent to which these entrepreneurs pursued this opportunity.

The business group entrepreneurs, structurally more autonomous, were not inhibited by the inertial pressures of the ongoing relations. This allowed them more avenues to pursue when organizing the new industry. They sought sea urchins on a year round basis, moved into the processing sector, adopted an expansion orientation, and competed directly with other entrepreneurs along the coast. Each of these directions contradicted the organizational strategies of the traditional entrepreneurs. The traditional entrepreneur follows an organizational strategy that includes switching among fisheries based on season, long-term reciprocal relations with harvesters, and an association with a particular port or region of the coast. The sea urchin industry changed as a result of the new entrepreneurs' organizing strategies, and inertial pressures on traditional entrepreneurs kept them from changing with it.

The development of the transient organizational strategy provides an interesting combination of social capital advantage and autonomy from inertial pressures. This group came predominantly, though not exclusively, from the Cambodian and Vietnamese refugee communities in New England. Similar to the advantages traditional entrepreneurs have in mobilizing harvesting labor, these entrepreneurs had an advantage in mobilizing a labor force to process sea urchins. Embedded in the local refugee communities, these entrepreneurs could easily mobilize a processing labor force. However, this group of entrepreneurs was not embedded within the waterfront at all. This autonomy allowed them to develop the transient strategy for securing a supply of sea urchins.

Labor Processes. Inertial pressures played a key role in the labor process also. Established harvesters moved into the new fishery as local dealers approached them.

These harvesters were already embedded in the waterfront both internally with investments in physical capital and externally with ongoing relationships with other actors within the organizational field. Being embedded allowed their easy movement into the new fishery, but these same ties inhibited their interest in the new fishery. As the industry changed in the entrepreneurial sector these harvesters chose to maintain their existing relations rather than adapt to the requirements of the new industry.

Other harvesters who moved into the new fishery were not already established on the waterfront, and consequently held more autonomy from the inertial pressures. One group of young harvesters came from waterfront communities, but had not established their careers as inshore fishermen. A second group of harvesters came from outside the waterfront context, and moved to commercial fishing to take advantage of the employment opportunity. Neither of these groups were limited by existing social and cultural relations, and therefore adapted easily with the changes in the new fishery.

Imitation and Economic Action

Economists assume that economic actors will calculate preferences independently of other actors. Sociologists assume actors make economic decisions and develop strategies with direct reference to other actors. In particular, actors imitate the decisions and strategies of other actors in similar circumstances whom they deem to be successful. Imitation is a way of dealing with the problems of uncertainty. In uncertain situations, economic actors often follow the actions of friends, neighbors, business associates, and competitors. DiMaggio and Powell (1983) call these mimetic pressures, when firms model themselves on other firms that they consider legitimate or successful.

Expansion and Integration

Imitation was key to one of the defining developments of the sea urchin industry, the decision by many entrepreneurs to move from exporting whole/live sea urchins to begin exporting processed sea urchins. The decision to process was a decision to integrate activities previously carried out by other firms in the productive system. This included taking on substantial costs in equipment, facilities, and labor. Perhaps most important, the decision to process was a decision to enter a different market, a larger but a lower quality market supplying a more modest customer.

Entrepreneurs made the decision to integrate and move into a new market because of a belief that survival in the industry depended on the ability to expand production. These entrepreneurs saw expansion as a necessary step for survival in the industry. Operating without normative or experiential guides to organizing their business, the new entrepreneurs innovated and imitated each other as they developed larger, more integrated firms. First, this involved establishing relations with the large trading companies in Japan who had the money and networks to handle the increased shipment of supply. These trading companies held the financial capability to support the integration of productive activities. These trading companies were key to making the move to the processing sector, but the willingness these larger companies found among new entrepreneurs is equally important. The new entrepreneurs were looking for the expansion opportunities. Monitoring the behaviors of other firms, they believed reaching a larger market was the key to their survival. Without that access, their business would fail. Moving into processing was the way to reach that market. The influence of these

mimetic pressures stands out in the contrast of traditional entrepreneurs and new entrepreneurs who resisted these pressures and chose to stay in the whole/live market.

Career Strategies

Imitation was again apparent in the labor process as young harvesters from the waterfront context moved into the sea urchin fishery. Although not yet established in a commercial inshore fishing industry, these fishermen intended to become established. To accomplish this, these harvesters followed a strategy adopted by many harvesters along the waterfront. This includes choosing a primary fishery in which to operate, and supplementing this fishery with work in other fisheries seasonally. Becoming established means investing in the fishery internally through investment in a boat and key gear. It also means investing externally in the establishment of key relationships and a reputation in that fishery. The harvester develops a level of commitment to their primary fishery, which they do not hold for other supplemental work. As opportunities in the sea urchin fishery arose, many young harvesters took advantage of the new opportunity by choosing the new fishery as their primary fishery. These harvesters developed their career strategies by imitating other successful harvesters. Through monitoring other successful harvesters, or harvesters who hold an amount of legitimacy in the local communities these harvesters developed strategies for their own careers. In many cases, these models were family members, or close friends and neighbors.

Blocked Exchanges

Sociologists recognize that certain types of economic actions are restricted, or blocked (Block, 1992:526). This dissertation has considered this concept in terms of both

open and closed relationships. If we can not assume unrestricted access to all economic activities, then it becomes as important to explain open as well as closed relationships. Productive relations are *open* to outsiders to the extent that participation is not denied, and *closed* to outsiders when participation is excluded, limited or subject to conditions (Weber, 1968:43). Drawing on Weber, the institutional approach to labor processes emphasizes two mechanisms that work to keep productive systems closed: access to property (Parkin, 1979) and the filtering of personnel (DiMaggio and Powell, 1983). The importance of property is clear; control over property includes control of the material resources essential to the productive process. Filtering of personnel is an attempt by members of an occupation to "control the production of the producers (Larson, 1977:49)." This is done through admitting only those with certain characteristics (i.e. professional training, required credentials, membership in trade associations) to participate.

When the first entrepreneurs began to consider shipping sea urchins to Japan, and when they approached the first harvesters to invest time in the industry, there were two potential restrictions on access to the resource that might have stalled the development of the new industry. There may have been state limitations, and there may have been informal limitations on access to the resource.

Access Limitations

The first seven years of the industry took place primarily along the coasts of Maine where the state legislature holds the ultimate rights over resources within the three-mile limit. Important decisions on the management of this resource follow the channels of all law making in the state. The Department of Marine Resources is the

administrative body that controls the resource on a day-to-day basis through the edict of the State. The DMR could have limited entry to the sea urchin fishery when the first sea urchins began selling in Japan, but they did not. Two factors contributed to DMR's not restricting access, however. First, the department had no precedent for restricting access, and there was no movement from within the department to establish a precedent with this new fishery. This lack of precedent combined with a push from the Governor through the DMR to develop the state's commercial fisheries industries. These forces targeted unusual, underutilized fisheries such as the sea urchin as an area for growth.

If the state did not establish formal restrictions to resource access, there may have been informal restrictions from local producers. These types of informal restrictions on access to common property resources are common in many settings, one of the most well known cases being the lobster gangs of Maine. Two factors contributed to this lack of territorial enforcement. One factor discouraging informal restrictions on access to the sea urchin fishery lies in the species-specific character of lobster gang's territoriality. While the gangs act as a strong filter on access to the lobster fishery, they do not exert much control on access to other fisheries. A second reason for the lobster gangs not exerting control on access to the sea urchin fishery lies in the unusual qualities of the species. The sea urchin fit the lobster fisherman's definition of a trash fish. Not only did lobster gangs not restrict access to the sea urchin fishery, they were happy to see them go.

Open Labor Practices

Along with open access to resources, the labor markets along the waterfront include cooperative social relationships that are subject to little restriction. One set of cooperative relationships exists between harvesters and local dealers. Harvesters and

dealers often cooperate in order to explore the possibilities of new fishery related products. These social relations are not exclusive partnerships between pairs, but are a part of the economic life of the waterfront. Dealers cooperate with many different harvesters, and harvesters cooperate with different dealers when exploring these new ventures. Similarly, harvesters using different technologies often cooperate in order to work in new fisheries. Individually neither harvester would be able to work in a fishery, but through cooperation, they can. These relationships are not restrictive either. They may last a few days, a season, or multiple years. Initiating, ending, and in some cases re-establishing these relationships is common.

As we have seen, these open labor practices allowed easy movement of traditional entrepreneurs into the new sea urchin fishery. Established harvesters collaborated with established dealers to explore the new fishery. They also allowed harvesters to move into the fishery easily. Boat owners collaborated with SCUBA divers to work in the new fishery; experienced harvesters combined their knowledge with new harvesters to move into the new fishery. Open labor practices—the ability to establish, end and re-establish cooperative relations easily—allowed the easy movement of the traditional entrepreneurs and harvesters to the new fishery.

Expectations and Exchange

Institutional sociologists emphasize the influence of cultural expectations, the taken for granted understandings of every day life, on economic action. Actors extend these background expectations to those that they assume hold a world in common. Expectations may constitute the defining the rules of a specific context or situation, also. Actors may develop shared expectations through regular interaction, or they may assume

it given shared characteristics. Background and constitutive expectations have played a role in the inertial pressures and in the expectations of cooperation in the open labor market processes discussed above. Expectations of opportunism played a role in the formation of non-exclusive, market like exchange between harvesters and dealers, also.

Zucker (1986) points out that these expectations may provide trust in exchange relations; trust being the mutual confidence that no party to an exchange will exploit the other's vulnerability. In the Northwest Atlantic sea urchin industry expectations of distrust developed, and contributed to the non-exclusive, market like exchange relations between harvesters and coast-side dealers. The exchanges have indeterminate outcomes, and opportunistic behavior is rife—conditions that might lead to cooperative, trust-based exchange relations. However, these inefficient exchanges persist because the participants to the exchange expect opportunistic actions by participants to the exchange, and are unable to overcome these expectations.

The persistence of these relationships follows a two step path of development. First, the industry required the establishment of new exchange relations, rather than being based on existing exchange relations. As the industry developed the demography of the industry changed. Participants with established relations left the industry, and participants without established relations came to dominate the industry. Without the regular interactions, these actors could not rely on existing expectations of exchange. These new participants came from a variety of social backgrounds, also. Some from coastal communities, some not; some with commercial fishing experience, some not; some from European descent, some not. Without the shared characteristics, participants could not assume shared expectations.

At this point, the new participants to the industry might have developed expectations of trust based on regular exchange in the industry. Three social factors inhibited this development, however. First, the new entrepreneurs in the industry developed a reputation for taking advantage of harvesters by withholding market information. Whether true or not, these reputations have became a part of the harvester culture, and they contribute to a continued expectation of opportunistic behavior. Second, one group of new entrepreneurs came from the Cambodian and Vietnamese refugee community of New England, and use the transient strategy of securing a supply of sea urchins. The heterogeneous background discouraged expectations of trust, and the transient strategy did not lend itself to regular exchange that might develop expectations of trust. Finally, the regular turnover in the industry, particularly in the processing sector, made the establishment of expectations of trust based on regular exchange difficult. Without the development of trust expectations, participants approached exchange relations with an assumption of opportunism on the part of exchange partners and the persistence of non-exclusive market like relations.

Summary of Findings and Contributions of the Research

I would like to finish by reviewing some of the important findings of this research and by considering some further implications of this analysis to the field of economic sociology. To this point, the conclusion addresses the primary significance of the research. It takes an important step by bringing together an important empirical literature on unique forms

of economic organization with a more theoretically formal literature in economic sociology[53].

The empirical literature primarily includes case studies of network forms of production. In some cases they focus on networks in particular industries, some on small-firm networks that concentrate in certain regions (Silicon Valley in California, the Emilia-Romagna Region of Northern Italy, and Southwestern Germany), and some on large networks that span the globe (Japanese and Korean business groups). These cases are interesting because they combine cooperation and competition, and provide a contrast to markets and hierarchies. The formal economic sociology literature comes primarily from the network literature, but also includes contributions from organizational research and new institutional economics.

The research describes the unique set of organizational arrangements that came to dominate the Northwest Atlantic sea urchin industry, and it uses concepts from economic sociology to examine how these forms came to dominate the industry, and not some others. While this research is a case study itself, I believe it has some implications for the more formal literature in economic sociology that I would like to suggest here.

Economics and Economic Sociology

In Chapter 1, I outline the differences between the economic and sociological approach to economic life. This research contributes to research on economic institutions by demonstrating the salience of sociological variables in explaining the formation and persistence of economic institutions.

[53] The complements of these two research directions has been discussed at length by Powell (1990a; Powell and Smith-Doer, 1994)

First, the analysis demonstrates the social capital advantages of embedded economic activity. Actors with existing and trusting relations embedded in ongoing economic contexts hold advantages of access to opportunities that other actors do not hold. Equally important, existing and ongoing relations can place create inertial pressures, limiting the movement of actors. These inherently social variables help explain how opportunities arise and who takes advantage of the opportunities. Imitation in economic action is similarly a social process. Economic actors make decisions, not individually, but in reference to other actors. In uncertain circumstances, actors turn to the practices of others they deem successful and mimic those practices in their own activities. With new industries, imitation of new innovative activities leads to isomorphic activities and to the establishment of new institutions. Finally, demographic changes and reputations contribute to the inability to overcome expectations of opportunism, which in turn lead to the persistence of market-like relations.

These concepts from economic sociology have contributed to the understanding of the economic processes of the Northwest Atlantic sea urchin industry. In turn, these findings contribute to the field of economic sociology by providing further evidence for the salience of these concepts. In addition to this contribution, I believe this research has some larger implications for the economic sociology literature. Particularly the theoretical work on economic institutions and small-firm networks.

The Limits of Social Networks

Much has been made about the economic advantages of small-firm networks. Best (1990) heralded them as the "New Competition" and organizational sociologists have admired the small-firm networks' ability to adapt to changing economic

circumstances: light on their feet, flexible boundaries. This research did find the network-like relations of the working waterfront to resemble these descriptions of the network form of organizing production. Here production was "light on its feet" and able to open its boundaries and adapt to the new sea urchin fishery. Those existing social relations gave actors an advantage in the changing economic environment. There was a unique competition here, found in the flexible adaptation of the existing social relations on the waterfront.

There were clearly limits, however, to the adaptability of these particular relations. The inertial pressures of ongoing economic relations inhibited both dealers and harvesters from taking advantage of the new opportunities fully. The limits of the network form of relations lie partly in the structural aspects of the relations. The strong network ties, and the sunk costs of the existing economic relations discouraged the actors from moving fully into the new industry. In addition, the limits of these ties lie in the institutional aspects of these relationships. The dealers chose to uphold expectations and their reputation in the ongoing economic relations. Harvesters chose to honor expectations and to follow certain career strategies that have become part of inshore fisheries along the working waterfront. These pressures are not strictly structural, but follow from cultural expectations and understandings about production on the working waterfront.

The network-like relations on the waterfront were finally limited through competition with other organizational forms that inhabited the sea urchin industry. The inertia described above stands in contrast to the actions of actors coming from outside the context of the working waterfront. These actors operated without the inertial pressures

of existing relations and were able to expand and create new forms of organization and competition in the industry. Those holding the existing network-like relations were pushed out of the industry through competition with the non-network organizational forms.

Institutions and Innovations

If the network relations on the working waterfront limited some actors in the industry, the open character of these relations allowed the entrance of new actors to the industry. Rather than starting from scratch, these new actors used the already existing organizational form to create new innovative forms of organization. In this way, the existing institutions of production lead to the emergence of new innovative forms of organization.

One place we can see this evolutionary process is the organizational strategies of the business group entrepreneurs. Here entrepreneurs met with organizational obstacles to production. In overcoming these obstacles, this group of entrepreneurs developed the business group organizational strategy described above. This organizational strategy "piggybacks" on the existing organization of production on the waterfront, however. The business group entrepreneurs tapped into the existing inshore institutions to develop their business groups. There are two important aspects of this piggyback relationship. First, the existing institutions are essential for overcoming obstacles to production. Without that existing organizational form, these entrepreneurs would have had difficulty becoming established in the sea urchin industry. Second, the piggyback process resulted in a new, and fundamentally different, organizational form than the initial institutions it relied upon.

We can again see the importance of existing institutions in the creation of organizational innovations with the spot markets in the sea urchin industry. First, consider the transient entrepreneurs' strategies for securing a supply of sea urchins. The strategy of transient entrepreneurs describe above relied on the existence of markets for sea urchins that began to develop through business group competition. Without a group of harvesters prepared to sell their catch to the highest bidder these entrepreneurs would have found it difficult to get started in the sea urchin industry. The transient strategy transformed these markets, and created an organizational form unique to the business group and traditional organizational strategies. Similarly, the plural forms of organizing exchange discussed in Chapter 4 use the spot markets to create unique organizational strategies that combine organizational forms.

Learning Trust

Finally, this research provides some insight to persistent questions about creating trust based economic relations. Trust can be found and lost, but not created according to many observers (Sabel, 1993:104). The sea urchin industry provides examples of finding and losing trust, as well as demonstrating the difficulty of overcoming distrust. Trust was lost through the demographic shift in the industry. As the traditional entrepreneurs and established harvesters who held long-term reciprocal ties left the industry, the overall amount of trust in the industry declined. Participants in the whole/live sector appear to have found trust. Here a group of harvesters and dealers not established on the waterfront have developed long-term reciprocal relations similar to those utilized by established actors.

The research provides a stark example of the difficulties in overcoming obstacles to trust as well. The exchange relations that make up the spot markets at public piers along the coast have developed an institutionalized distrust among participants. Under economic conditions that clearly would lend themselves to trust based long-term exchange relations, deceit and guile persist. While trust based economic relations were able to develop in the whole/live sector, the distrust at the spot markets demonstrate the obstacles to trust that can develop within organizational fields.

Summary of Findings

This discussion returns to questions first raised in the introduction to this dissertation.[54] How do social forces influence the initiation and development of these unique organizational forms? Do the cooperation and trust found in these relations result from rational pursuit of self-interest? Do they rely on the influence of existing social relations in economic life? Much is made of the advantages of networks. Do limits to the adaptability of these organizational forms exist? How might social forces constrain the adaptability of production networks?

The analysis of the Northwest Atlantic sea urchin industry contained within these pages examines this unique commercial fishery from the perspective of economic sociology. In turn, the analysis provides some insight to questions at the core of the new economic sociology:

- Social relations, particularly existing institutions, provide a stepping stone for new innovative institutions that develop.
- Rational self-interest alone does not guarantee the development of trust based exchange.

[54] I first develop these questions in pages 1-6, and restate them on pages 19-20.

- Existing social relations can contribute to the persistence of distrust in exchange.
- Existing social relations and the expectations that accompany those relations can limit the adaptability of actors in these networks.

The evolutionary development of the Northwest Atlantic sea urchin industry, and the organizational dynamics of small-firms in that industry, does not provide the final word on these questions. However, by bringing together an important case study literature on unique forms of economic organization with a more theoretically formal literature in economic sociology to examine this unique industry, this research takes a first step.

APPENDIX

SEMI-STRUCTURED INTERVIEW GUIDES

THIS APPENDIX INCLUDES THREE INTERVIEW GUIDES I USED WHILE CONDUCTING SEMI-structured in-depth interviews of sea urchin industry participants. I used the guides during interviews with harvesters, dealers, and processors in the industry. I did not follow these guides rigidly during the interviews. Instead, they were to remind me of subjects I meant to cover at some point during the interview, and to help me prepare for interviews. Any one interview might follow a number of directions, covering these issues in different sequences, and covering issues not set out in the interview guide.

The guide primarily includes a set of subjects I planned to cover in the interview with sub-sections included with each subject. At the end of the interview guide I include a set of actual questions I might ask during the interview in order to obtain the information included in the guide. These questions were meant to establish a conversation, and most information was obtained through probing follow-up questions.

Urchin Harvester Interview Guide.

When did you first realize there was a market for sea urchins?

- Year started.
- Who introduced to industry?
- How obtained equipment to get started?
- How learned techniques of fishing?

What did you do before you were harvesting / in urchin fishery?

- Tending another sea urchin diver.
- Worked in other fisheries.
- Other non-commercial fishery types of work?
- Still does this work?
- If so, does this other work in this area?

What do you currently do when not urchin diving?

- Works in other fisheries.
- Does other types of work.
- Works in this area.
- Which do you prefer sea urchin harvesting or other work?

Relationships with buyers.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relationships with processors.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relationships with other harvesters.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Organization of work.

- Do you own a boat?
- Do you work for yourself?
- Have you ever worked for a processor or buyer?
- What is your relationship with your tender?
- Do you work with other harvesters, form cooperatives?
- Do you trust other harvesters?
- How is money exchanged?

Role of the State.

- The regulation process?
- Like the moratorium? Should it be extended?
- Research fund?
- Are regulations good for the fishery?
- Do you like the zone system?
- East - South?
- Is the DMR a good manager of the resource?

Organization.

- Me Urchin Harvesters Association.
- Downeast urchin harvesters association. DE Draggers.
- Other fisheries organizations.
  - How did you hear about/get involved with these groups?
  - What do you think of these groups?
- Involved with Strike last winter?
  - How found out about strike?
- Agree with strikers?
- Attend public hearings?
  - Local or in Augusta?
    - Attend alone or with group?
    - How hear about meetings?
    - Do they get any results?
- Processors' organizations?

Organizational Field.

- Admire others in Maine industry?
- Admire others in international industry?
- Who are your competitors?
- Who do you turn to for advice?
- Do you socialize with others in industry?

Future of Fishery.

- Aquaculture? Future/Funding?
- Is the resource sustainable?
- Do you see yourself in the fishery?
- If no, why leave?
- Any plans already set?
- Future plans in this area?

Why Fish?

1. When did you first realize there was a market for sea urchins?
2. Could you describe a typical day for you working in the sea urchin industry?
3. Could you describe for me, to the best of your knowledge, how an urchin gets form the ocean floor to a Japanese customer?
4. When you are making important business decisions who do you consult for advice?
5. Are there particular individuals in the Maine sea urchin industry that you admire?
6. Are the particular individuals in the International sea urchin industry that you admire?
7. Who are your competitors?
8. What is the Japanese market for urchins like?
9. What would be the best way for the state to manage the fishery resource?
10. Thinking of the next 5 to 10 years, do you see the urchin fishery lasting?
11. What influence have the Cambodians had on the industry?

Urchin Dealers Interview Guide.

When did you first realize there was a market for sea urchins?

- Year started.
- Who introduced?
- Need to raise money?
- Need to recruit labor?
- Other family involved?
- How did you learn? Did it require training?
- How did you secure supply? Harvesters? Dealers?
- Do you work with exporters? The Japanese?

What did you do before you were in the urchin fishery?

- Worked in other fisheries.
- Other non-commercial fishery types of work?
- Still does this work?
- If so, does this other work in this area?

What do you currently do when not buying and selling urchins?

- Worked in other fisheries.
- Other non-commercial fishery types of work?
- Still does this work?
- If so, does this other work in this area?

Relationships with harvesters.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relationship with processors and exporters.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relationships with Other buyers.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Organizational Field.

- Admire others in Maine industry?
- Admire others in international industry?
- Who are your competitors?
- Who do you turn to for advice?
- Do you socialize with others in industry?

Industry Organization.

- What do you think of harvesters' organizations
- Processors' organizations
- Do you get involved?
- What do you think of the strike?
- Are they legitimate concerns?
- Do you attend public meetings?
- Local or in Augusta?
- Do you attend alone or in a group?
- How hear about meetings?
- Story/Results?

Role of the State.

- The regulation process?
- Like the moratorium? Should it be extended?
- Research fund?
- Are regulations good for the fishery?
- Do you like the zone system?
- East - South?
- Is the DMR a good manager of the resource?

Future of Fishery.

- Aquaculture? Future/Funding?
- Is the resource sustainable?
- Do you see yourself in the fishery?
- If no, why leave?
- Any plans already set?
- Future plans in this area?

Why the Seafood Industry?

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12. When did you first realize there was a market for sea urchins?
13. Could you describe a typical day for you working in the sea urchin industry?
14. Could you describe for me, to the best of your knowledge, how an urchin gets form the ocean floor to a Japanese customer?
15. When you are making important business decisions who do you consult for advice?
16. Are there particular individuals in the Maine sea urchin industry that you admire?
17. Are the particular individuals in the International sea urchin industry that you admire?
18. Who are your competitors?
19. What is the Japanese market for urchins like?
20. What would be the best way for the state to manage the fishery resource?
21. Thinking of the next 5 to 10 years, do you see the urchin fishery lasting?

Urchin Processor Interview Guide.

When did you first realize there was a market for sea urchins?

- Year started.
- Who introduced?
- Need to raise money?
- Need to recruit labor?
- Other family involved?
- How did you learn? Did it require training?
- How did you secure supply? Harvesters? Dealers?
- Do you work with exporters? The Japanese?
- Type of market: whole/live or processed.

What did you do before you were in the urchin fishery?

- Worked in other fisheries.
- Other non-commercial fishery types of work?
- Still does this work?
- If so, does this other work in this area?

What do you currently do when not processing urchins?

- Worked in other fisheries.
- Other non-commercial fishery types of work?
- Still does this work?
- If so, does this other work in this area?

Relationships with buyers.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relationship with Exporters

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Relations with Harvesters.

- History of relations with buyers.
- Do you use long term relations?
- Do you use more than one? How many buyers?
- How did you meet your buyer(s)?
- Do you switch buyers often?
- Do you establish exchange deals outside of exchange?
- How is money exchanged?
- Do you trust your buyer(s)?
- Do you ever work with Cambodian buyers?
- Have you noticed changes over time in selling your catch?

Organizational Field.

- Admire others in Maine industry?
- Admire others in international industry?
- Who are your competitors?
- Who do you turn to for advice?
- Do you socialize with others in industry?

Industry Organization.

- What do you think of harvesters' organizations
- Processors' organizations
- Do you get involved?
- What do you think of the strike?
- Are they legitimate concerns?
- Do you attend public meetings?
- Local or in Augusta?
- Do you attend alone or in a group?
- How hear about meetings?
- Story/Results?

Role of the State.

- The regulation process?
- Like the moratorium? Should it be extended?
- Research fund?
- Are regulations good for the fishery?
- Do you like the zone system?
- East - South?
- Is the DMR a good manager of the resource?

Future of Fishery.

- Aquaculture? Future/Funding?
- Is the resource sustainable?
- Do you see yourself in the fishery?
- If no, why leave?
- Any plans already set?
- Future plans in this area?

Why the Seafood Industry?

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22. When did you first realize there was a market for sea urchins?
23. Could you describe a typical day for you working in the sea urchin industry?
24. Could you describe for me, to the best of your knowledge, how an urchin gets form the ocean floor to a Japanese customer?
25. When you are making important business decisions who do you consult for advice?
26. Are there particular individuals in the Maine sea urchin industry that you admire?
27. Are the particular individuals in the International sea urchin industry that you admire?
28. What is the Japanese market for urchins like?
29. What would be the best way for the state to manage the fishery resource?
30. Thinking of the next 5 to 10 years, do you see the urchin fishery lasting?

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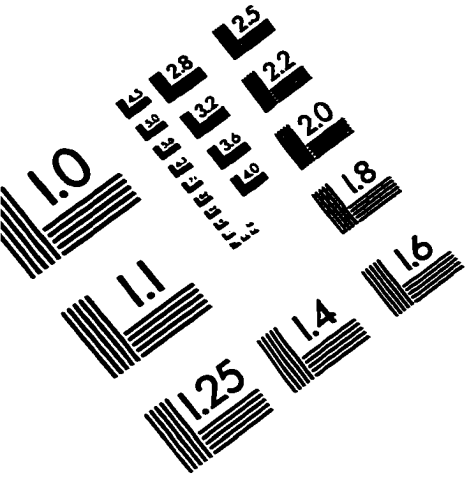

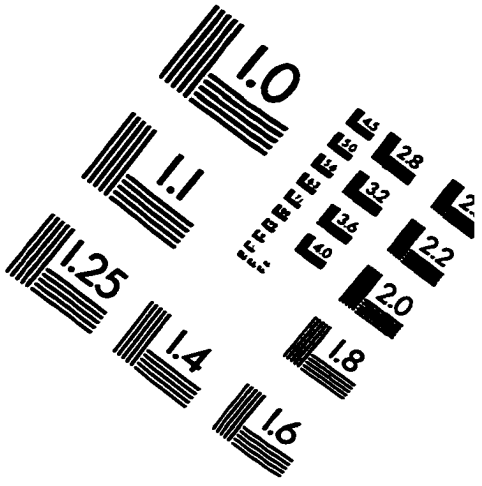

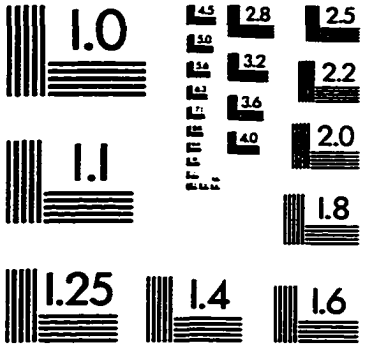

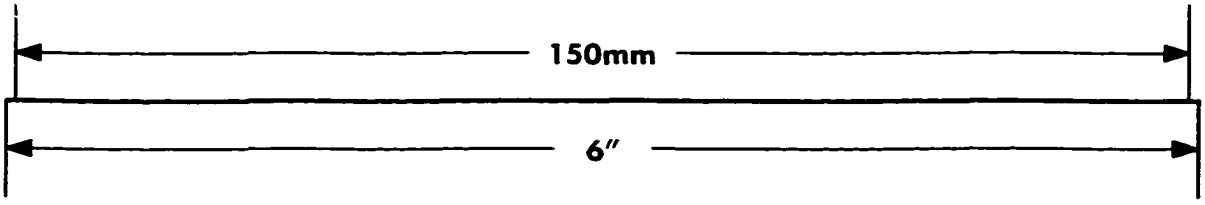

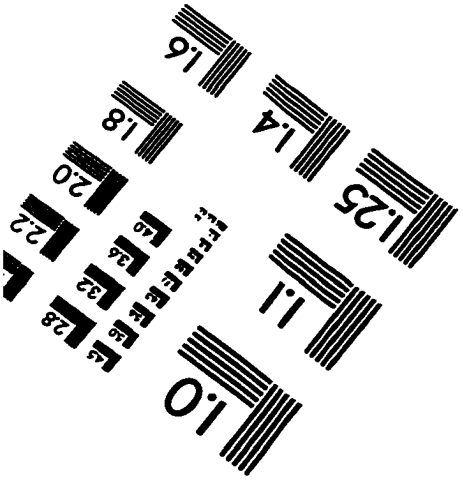

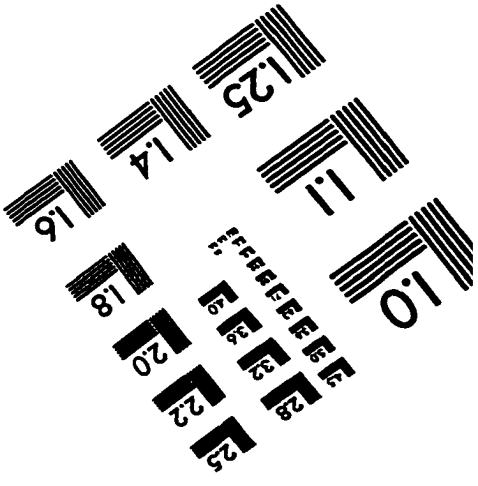

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